BBC

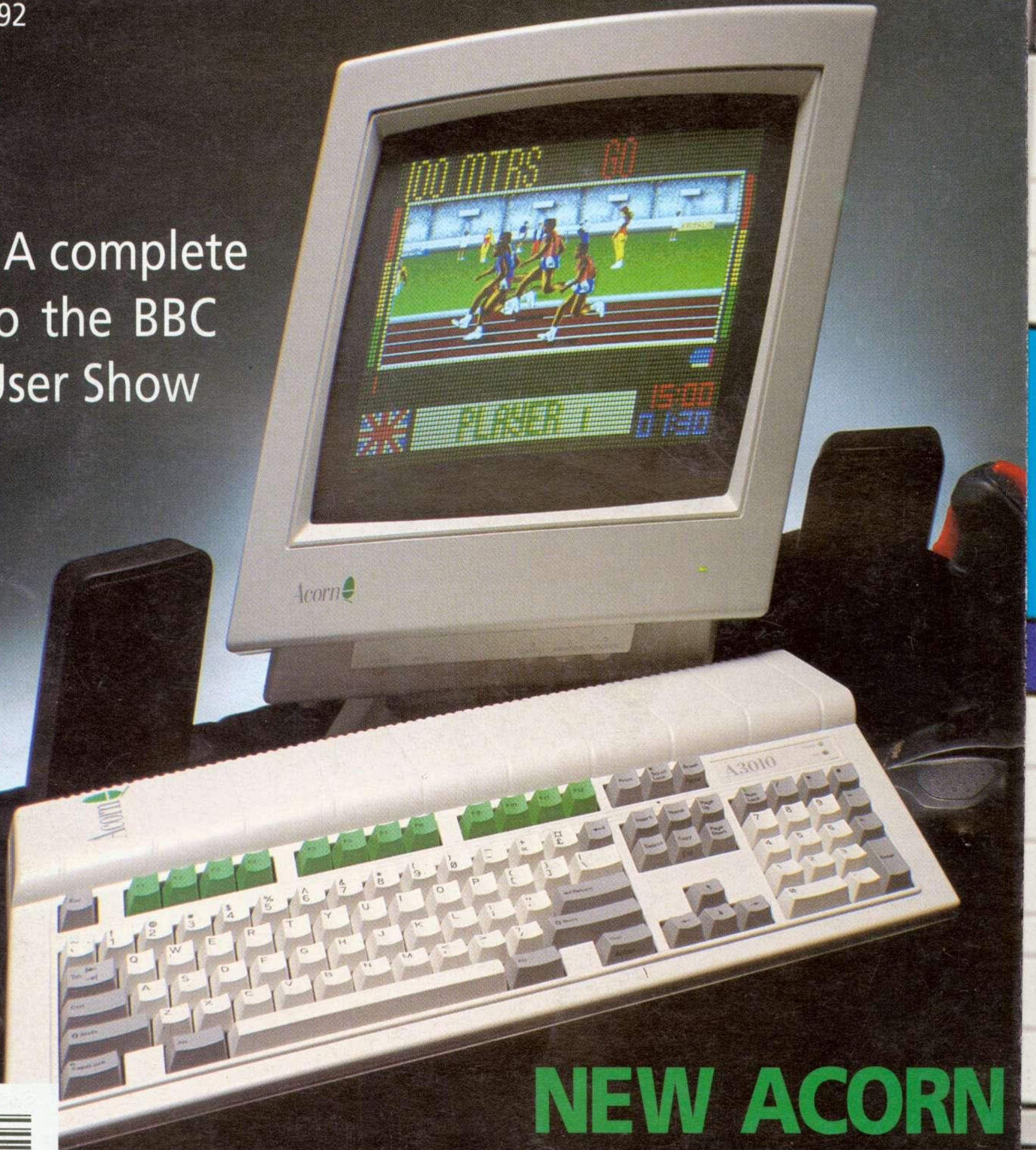
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ACORN USER

OCTOBER 1992

£1.80

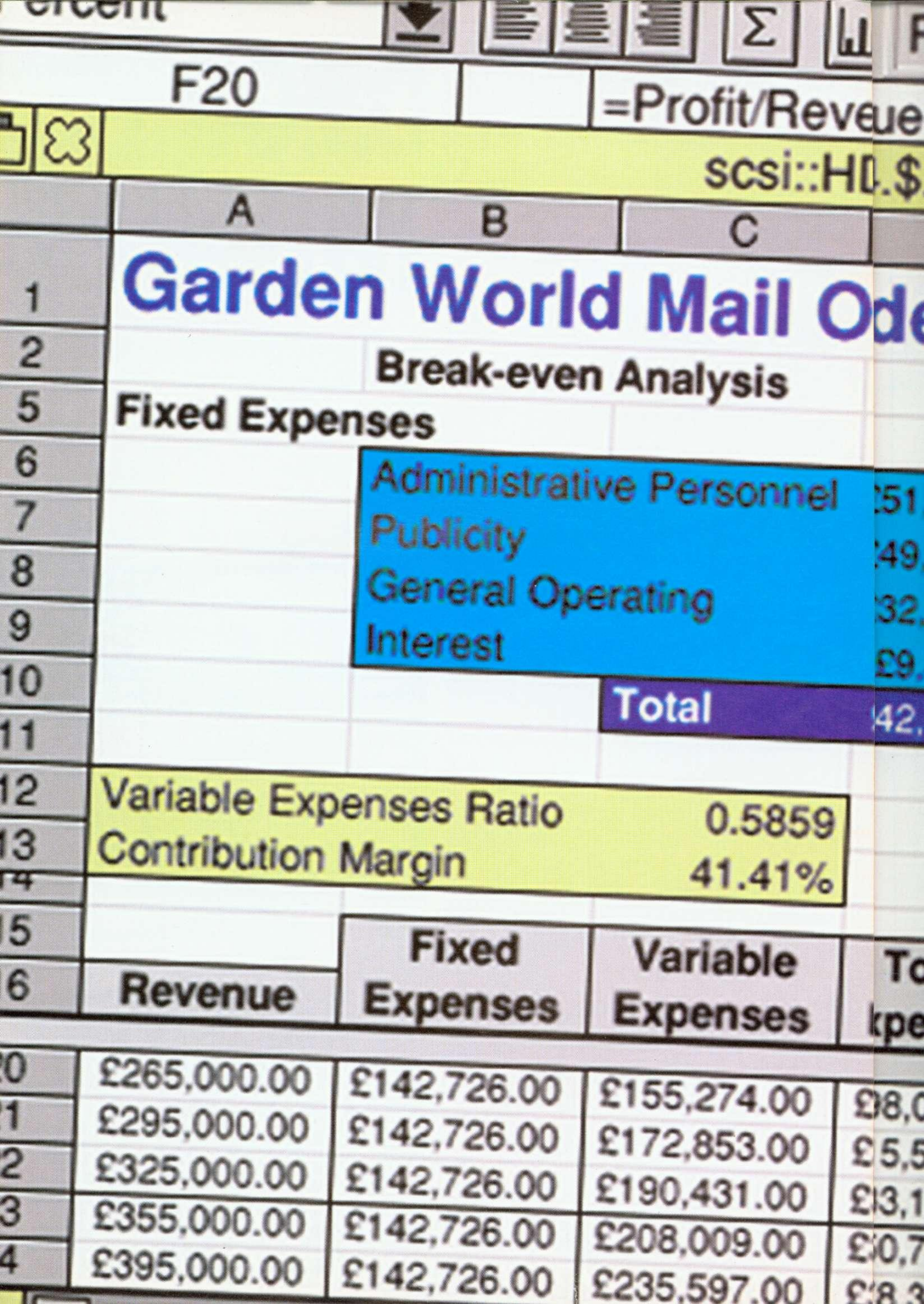
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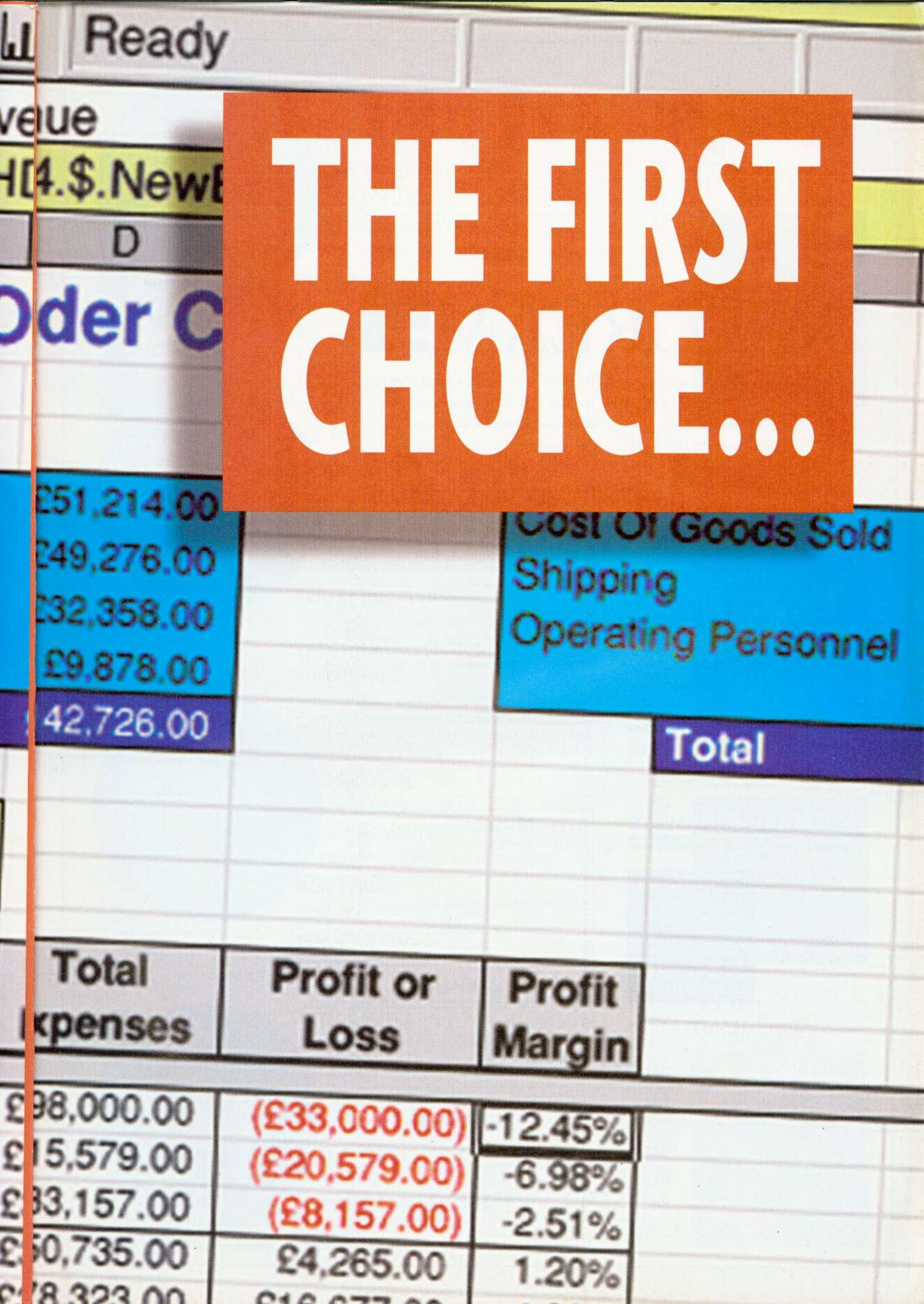
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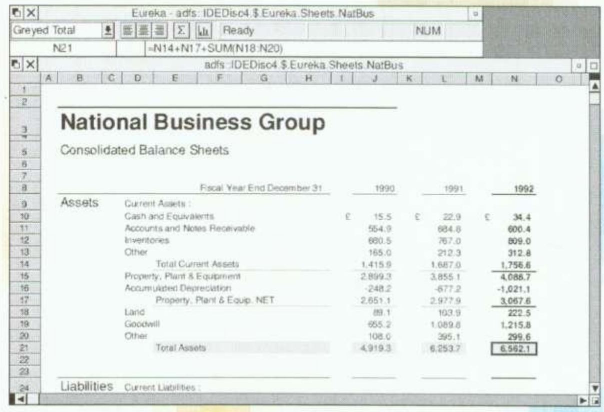

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Break-even Analysis
5
Fixed Expenses
6
Administrative Personnel
7
Publicity
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General Operating
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Interest
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Total
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12
Variable Expenses Ratio
0.5859
13
Contribution Margin
41.41%
15
16
Revenue
Fixed Expenses
Variable Expenses
£265,000.00
£142,726.00
£155,274.00
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THE FIRST CHOICE...

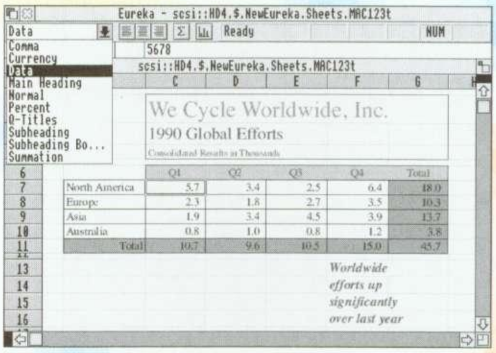


EUREKA!

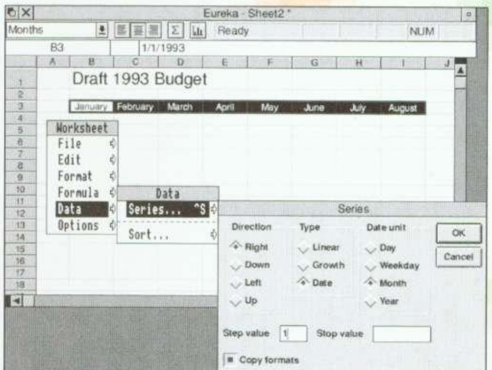
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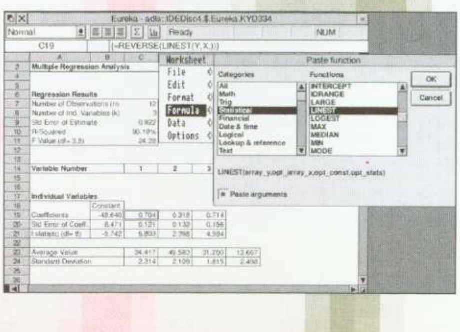
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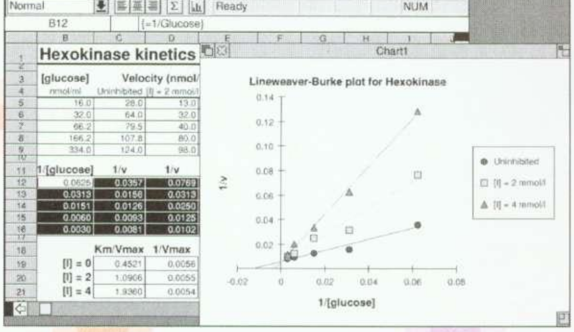


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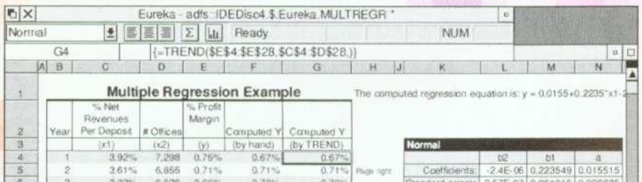


With over 155 built in functions, Eureka users have all the analytical mathematical power they will ever need, at their fingertips.

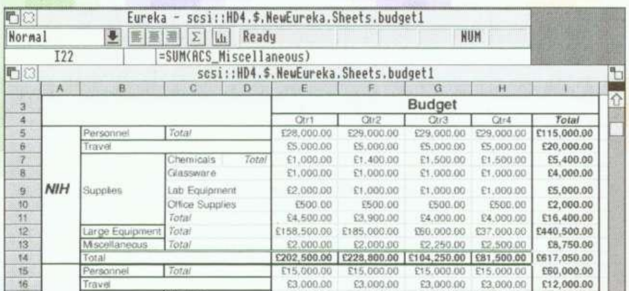
OPLE WHO
USINESS



Eureka offers crisp, accurate business charting in a wide variety of formats.



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Eureka is priced at £119 + VAT. For any Acorn computer running RISC OS with 2Mb of RAM or more. Proposed publication: October 1992.

Eureka contains over 150 built-in functions:

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PI SIN COS
TAN ASIN
ACOS ATAN
SINH COSH
TANH ASINH
ACOSH
ATANH
RADIANS
DEGREES
ATAN2

Information
NA ISNA
ISBLANK
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ISREF ISERR
ISERROR
ISNONTEXT
ISNUMBER
ISTEXT N T
TYPE
ERROR.TYPE
ROW
COLUMN
ROWS
COLUMNS

Statistical
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MAX MIN
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MEDIAN
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IQRANGE
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LARGE SMALL
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VAR VARP
GEOMEAN
HARMEAN
NRAND SLOPE
INTERCEPT
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LOGEST
TREND
GROWTH

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RAND ABS
INT SIGN EXP
LN LOG10
SQRT FACT
FRACTION
EVEN ODD
LOG MOD
ROUND
TRUNC
CEILING
FLOOR
RANDBETWEEN
PRODUCT
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SUMX2PY2
SUMX2MY2
SUMXMY2

Matrix
TRANSPOSE
MDETERM
MINVERSE
MMULT

Logical
FALSE TRUE IF
AND OR NOT

Time
NOW TODAY
DAYS360 DAY
HOUR MINUTE
MONTH
SECOND
WEEKDAY
YEAR DAYS
DATE TIME

String
CHAR FIXED
DOLLAR
CLEAN CODE
LEN LOWER
TRIM UPPER
PROPER
DATEVALUE
TIMEVALUE
VALUE RIGHT
EXACT LEFT
REPT TEXT
FIND SEARCH
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PV FV PMT
NPER RATE
IPMT PPMT
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OCTOBER 1992
ISSUE 123



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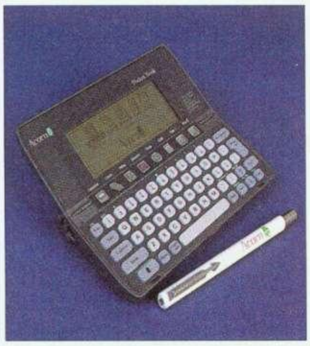
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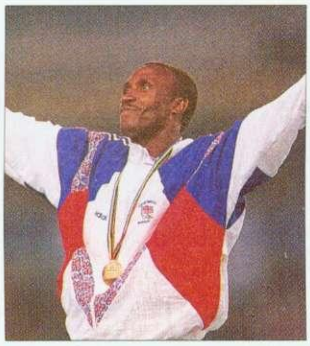
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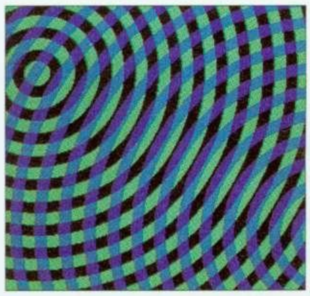
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All the editorial pages in BBC Acorn User are produced on a DTP system using Acorn computers, Computer Concepts' *Impression 2* with Laser Direct printers and Taxan monitors









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– Fast parallel card	*Iota*	£98
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i-Scan 400	*Irlam*	£589
Pineapple Colour Video Digitiser	*Pineapple*	£195
– A3000 boxed	*Pineapple*	£230
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BBC Basic Guide *Acorn* V0 £19
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Blaston *Eterna* £14
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Bubble Fair *Eterna* £14
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Castle of Dreams *Storm* £17
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Craftshop 1 *4mation* £27
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Drop Ship *Fourth Dim* £16
DTP Graphics 1 Mono, sprites *Micro Studio* £15
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– each pack *Acorn* £35
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– age -6, age 6-8, age 8+ each £15
Fun School 3 *Database*
– age -5, age 5-7, age 8+ each £18
Fun School 4 *Database*
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Genesis I *Oak* £40
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Gods *Krisalis* £19
Good Impression *Word Processing* V0 £27
GraphBox *Minerva* £55
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Graphic Writer *Clares* £24
Greetings Graphics, draw/sprites *Micro Studio* £16
Gribbly's Day Out *Coin-Age* £21
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Hearsay II *RISC* £70
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Imagine *Topologika* £39
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– A4 version £POA•
– network version £650
– site licence £545
– extra hardware key for sites only £15
– extra manual for sites only V0 £8
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Insight *Longman* £68
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Jigsaw *4mation* £27
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Karma *Periscope* £21
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Logistix *Acorn* £77
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Mark Master *Chalksoft* £67
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Mazes, drawfiles *Micro Studio* £16
Memory Magic *CIS* £12
Mental Maths *CIS* £15
MicroDrive Golf *CIS* £14
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Micro Trader Accounts *PRES* £199
MiG-29 Superfulcrum *Domark* £29
Military History, sprites *Micro Studio* £16
Minotaur *Minerva* £8
Missile Control *Minerva* £8
Mogul *Ace* £20
Money Matters *Triple R* £15
Movaword *Chalksoft* £17
Mr Doo *CIS* £16
MultiFS *Arxe* £27
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Nature Graphics, draw/sprites *Micro Studio* £16
Nebulus *Krisalis* £19
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Nevryon 2 – Technodream *Fourth Dim* £21
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Padlock *ICS* £10
– site licence £30
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ACORN LAUNCHES FLEET OF MACHINES

WELL before the *BBC Acorn User* Show, Acorn has announced the release of three major new Risc OS 3 machines. The Acorn A3010, the Acorn A3020 and the Acorn A4000. These complement Acorn's current machines, the A4, the A3000 and the A540. Also, in a surprise announcement the company has revealed a new link-up with Psion, the first fruit of which is the Acorn Pocket Book.

The machines are based around a new chip from Arm Ltd, the Arm250. The Arm250 is a large chip incorporating the original four chip set, Arm, Vidc, IOC and Memc.

The Pocket Book is based around Psion technology, with software written by Computer Concepts that facilitates easy transfer of notes and diaries to a desktop Acorn machine.



The A3010 family machine

Acorn has called the A3010 the family machine and it is designed to be equally appropriate for games or home-based education. It is less deep than the A3000, with distinctive green keys. It also has a high-density 3.5in floppy drive, allowing floppies to be formatted to Risc Os 1.6Mb, or Dos 1.44Mb format.

The basic A3010 can be purchased for £499.95 inc VAT, and for this you get just the machine, with a floppy disc drive, no hard drive, monitor or printer. The lack of monitor is balanced by a TV modulator inside the machine, allowing it to use a normal television as a display. In keeping with the games-oriented image the machine will undoubtedly hold, there are two joystick ports on the rear of the machine, and a socket for connection to stereo headphones or a hi-fi. There is also a monitor connection, a serial port for communications and, in keeping with the rest of the range, a bidirectional parallel port. Hard drives and extra memory are optional.

The 2Mb A3020 is the machine Acorn has aimed squarely at the education market. It has the option of networking facilities (both Econet and Ethernet), which it swaps for the joystick ports of the A3010. Both machines are in the same case (the A3020 has red keys, however), and both have the option of expansion in the form of a mini podule, like that of the existing A3000.

The more business-like A4000 is essentially an A3020 in a slimline box, with separate PC-style keyboard, monitor and 80Mb hard disc as standard. This machine is aimed at business but is also likely to appeal to many secondary schools.

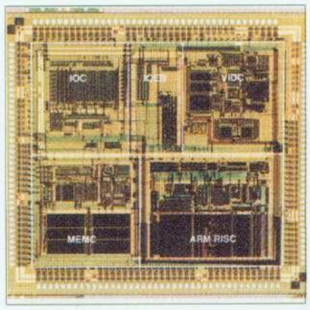
The new machines form the basis of Acorn 'solutions.' The Family Solution incorporates an A3010 with no hard drive, Minerva's *Easiword* word processor and 1Mb of memory. The A3010 Learning Curve package also includes the *PC Emulator* and *Genesis* applications.

The A4000 Home Office pack includes *EasiWriter 2*, Icon Technology's professional word processor and *Desktop Database*.

● At the press launch of the new machines, Acorn stated that it was a changed company, with new direction.

The launch will be boosted by adverts in the national press, a TV campaign, and the stocking of Acorn machines in most high street electrical stores, including Dixons, John Lewis and Argos. The machines will also be seen in leading home catalogues.

Bob Coates, Acorn's business development manager, said: 'everybody who wants a machine around Christmas time will have heard of, and be thinking of Acorn.'



The new Arm250

SHARE PRICES SOAR

SIX MONTHS ago, who would have predicted that Acorn's share price would rise from 6p to more than 40p on the unlisted securities market?

The price has hovered around 28p since July but, during August, it shot up over a third, past Amstrad's share price to a new high of 41.5p.

This gives Acorn a share value of £28 million, compared with £4 million at the beginning of the year.

Oddly enough, a speculative story in a computer trade weekly that Acorn was about to be sold by Olivetti failed to affect Acorn's share price. Acorn themselves categorically denied the story.

Understandably, there is now considerable optimism on the Acorn scene and for the first time in several years the company could see some excellent financial results later on in the year.

RISC UPGRADES READY

RISC OS 3 upgrades are now available to all Risc OS computer users, including A300 and A400 series owners.

The basic Risc OS 3.10 upgrade pack includes a set of replacement Roms and manuals and is list-priced at £89 inc VAT. However, a special £49 inc VAT price will be maintained until the middle of next year. A5000 owners can receive just the new Roms for £19 inc VAT.

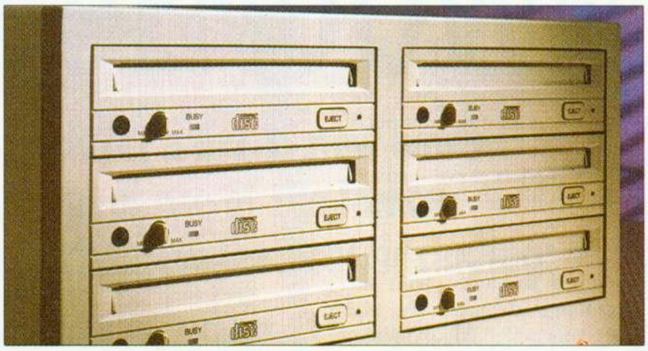
Risc OS 3 level improvements include the option of 3D window borders, 12 outline fonts in held in Rom, key enhanced Acorn applications like *Edit*, *Paint* and *Draw* in Rom, faster graphics, background disc and printing operations and iconised windows.

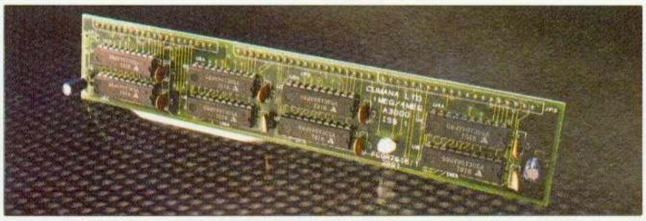
Risc OS 3 is compatible with all levels of Arm processor fitted to Archimedes models, and will be available from most Acorn suppliers.

CUMANA CUTS PRODUCT PRICES

CUMANA has reduced the price of its A3000 1Mb Ram upgrade from £50, excluding VAT and delivery, to just £29.95 inclusive. Cumana claims its slimline four-layer design offers lower RFI interference and easier fitting.

RFI interference suppression has also been improved in Cumana CD-Rom drives. According to Cumana, this has meant a 50 percent improvement in the data transfer. The performance improvement is experienced because less data is corrupted, so less error correction is required. The company has also knocked £500 off the price of its six-unit CXX436 CD-Rom array. The 25 percent cut brings the price of the Cumana array down to £1,495, excluding VAT. The CXX436 is designed for use as a multiple CD-Rom server for networks and is compatible with Acorn, RM and PC installations. Contact Cumana on (0483) 503121.


Cumana's CXX436 CD-Rom array: down by one-quarter


Cumana's 1Mb memory upgrade: half-price

NETWORK STANDARD

THE word has been out about Acorn's Universal Networking (AUN) environment for several months but now, at last, it has been officially launched.

AUN solves the problem of common access to the two main networking standards available to Acorn users: Acorn's proprietary Econet standard which has been around since Acorn's earliest days; and the much more powerful, though expensive, Ethernet standard, which is commonly used on other computer platforms as well.

AUN provides a common Risc OS operating environment for both Ethernet and Econet and an AUN set-up can consist of a number of separate Econet and Ethernet networks, linked up by an Ethernet backbone. Risc OS computers can then operate as gateways as well as local file servers.

A new release of Acorn's Level 4 file server software has been introduced with AUN in mind. Acorn's Mike O'Riordan said: 'AUN protects the existing user investments due to its compatibility with existing networks and its future proofing for tomorrow.' AUN product packs, which include the new Level 4 software, are priced from £399, excluding VAT.

● Acorn is not the only company to have launched an Ethernet-based enhancement for Acorn networks. Oak Solutions' ClassNet system is remarkably similar to AUN.

ClassNet can usefully link both Econet and Ethernet networks and offer gateway access to fileservers from both sides. Oak Solutions points out that ClassNet enables full integration of existing Econet systems with the latest Ethernet-based systems.

Oak says that an Ethernet-equipped ClassNet system with a Level 4 file server can load applications at speeds equivalent to hard discs, of the order of 600Kbps. Oak also claims its system can optimise performance by separating local activities out and preventing them from saturating the whole network.

The similarities between ClassNet and AUN are very clear – a direct comparison will be interesting. For further details and a free poster explaining more about ClassNet, contact Oak Solutions on (0274) 620423.

NET SPEED

DIGITAL Services, perhaps best known for its *Squirrel* database package, is launching a new Econet application that, the company claims, enables files to be loaded from an Econet workstation at the speed of a local hard disc.

Digital Services describes the as-yet-unnamed application as 'a real breakthrough in Econet technology which will reduce the frustration of slow load times for network users everywhere.' Ten-station starter packs will cost £200, reducing to £100 for further packs. Digital Services is on (0705) 210600.

ATOM DISC

A NEW software house called Arachne is developing a molecular modelling package aimed at the education market.

The Dorset-based company is offering a demonstration disc to potential customers for £5, which will be discounted off an eventual purchase. The package will be priced at £50.

For further details contact Jim Cameron at Arachne, Orchard Cottage, East Morden, Wareham, Dorset, BH20 7DL.

NEWS IN BRIEF

● Ian Copestake Ltd (ICS) has made a public statement to correct technical inaccuracies in a Cumana leaflet which could lead people to think that IDE hard drives might overload a BBC A3000's power supply. We understand that Cumana has now corrected the error.

'ICS has been selling IDE hard discs for Acorn computers for almost two years. The internal option has been an exceptionally reliable product and we would like to reassure our present and future customers that they need have no worries about its safety,' says ICS.

● *First* and *FirstJr*, the statistics packages available from South Wirral-based Serious Statistical Software, are to be Risc Os enhanced at last, which means they will multitask for the first time. *First* and *FirstJr* are claimed to be the most advanced statistical systems available for the Archimedes. For more information, phone SSS on 051-327 4268.

● Wild Vision has announced a MkIi version of its Hawk V9 colour digitiser card. The new card now offers a real-time digitised display with near TV-quality. The secret is in a hardware-based real-time dithering system which massages the image pixels into a smoother picture.

A product of Wild Vision's recent tie-up with Computer Concepts, the V9 MkII has benefitted from the latter's programmable gate array technology as used in LaserDirect and Scanlight cards. Secondly, despite the extra features, the card has been reduced in size to a single-width podule.

A competitive price is also promised – hopefully, to be revealed at the *BAU* show. Wild Vision is also hinting that a special version of the new card will be supplied specifically for the DTP market. Wild Vision can be contacted on 081-519 1455.

● The *Magpie* multimedia package now allows users to incorporate Replay sequences into their presentations. *BAU* will be putting this theory into practice in next month's issue and the result can be seen at the *BAU* show. For more *Magpie* details, contact Longman Logotron on (0223) 425558.

NEWS IN BRIEF

● The considerable interest in Acorn from the crucial high-street multiples that has been rejuvenated by the launch of the new A3010 'games' machine, has not apparently gone unnoticed at Commodore.

Just a few weeks prior to the A3010 launch, Commodore announced it was reducing the price of its latest entry-level computer, the Amiga 600, by £100 to just £299. The Amiga is considerably underpowered compared to the A3010 – it only has a 7.4MHz 16-bit 68000 processor compared to the A3010's 12MHz 32-bit Risc Arm250.

However, the Amiga's considerable games base and sheer affordability at its new price may place a question mark over Acorn's pricing of the A3010. Acorn points out, however, that the A3010 represents remarkable value as the only Risc-based computer for under £500. Nobody was available at Acorn to comment on Commodore's move.

● Derby-based junior and special needs education software developers Honormead Software Solutions have been appointed Acorn dealers.

Honormead's Dawn Alldread told *BAU* that the new arrangement will mean her firm can offer better facilities for offering software and hardware solutions to customers as well as training. Honormead can be contacted on (0332) 512848.

● A group of Archimedes computers survived the IRA bombing of the City of London earlier this year. The set of six Archimedes A400 series machines still functioned while the building around them was destroyed in the blast.

The six computers, owned by Telekurs Ltd, are used in two groups of three, with each group decoding satellite signals, and checking it against the data received by the other. When the bomb went off, one group failed a consistency check, but the other took over. Thirty seconds later, the first set had recovered, and assumed control.

The system as a whole did not fail during the blast. Apparently, pieces of glass were found embedded in the monitor cases after the event.

ACORN CONTINUES WITH THE A3000

ACORN'S market development manager, Bob Coates, has denied that the older Acorn entry-level Arc, the A3000, has been discontinued, now that the new A3010 and A3020 models have arrived. Neither will the A3000 get a price cut.

Coates equates the A3000's continued existence with the continuing demand for the now venerable BBC Master 128 computer, first introduced back in 1985. 'We still sell several thousand Masters a year,' he said, and added that he believed there would be sustained residual demand for the A3000, despite its slower speed and lack of a 1.6Mb floppy drive.



Rumours of the A3000's death are much exaggerated

He also denied rumours that the top of the range A540 would be discontinued. There had been speculation that the A540, which doesn't have a quad-density floppy drive like its newer siblings, was too expensive to make, since it uses the old A300 and A400-series case.

Apparently, batches of both the A540 and the A3000 will be built for as long as there is a demand. Coates did, however, confirm that production of the A400/1 Archimedes model ended some time ago.

● The A5000 has at long last been granted a more realistically sized hard drive as standard. Out goes the 40Mb version, to be replaced by an 80Mb unit.



A5000 gets the hard drive it deserves

A full-specification version of the A5000, with 4Mb Ram as standard, and a 120Mb drive, has also been added to the range. For networking applications, there are two new A5000 models fitted with Econet or Ethernet adapters but without hard discs.

The A5000 2Mb HD80 is priced at £1399 ex VAT, the A5000 4Mb HD120 at £1599 ex VAT, while the hard diskless A5000 NS (Econet) costs £1299 ex VAT and the A5000 NS (Ethernet) is priced at £1399 ex VAT. The A5000 Learning Curve bundle costs £1445.96 ex VAT.

BUDGET LASER PRINTER

A NEW low-cost, high specification, direct drive laser printer has been added to the Calligraph range.

Based on the Qume CrystalPrint Express engine, the new 600-12 model is also claimed to be the fastest direct driver laser available yet for Risc Os computers. Paper throughput is rated at 12 pages per minute and normal resolution is 600dpi, with a maximum of 1200dpi horizontally.

The new printer benefits from recent software improvements to Calligraph's control software – for example, the choice of paper bin is now selectable from the Risc Os desktop. Networking connectivity software is offered as a £69 option. The 600-12 printer is priced £1399 ex VAT, with a £100 discount to education customers. For further details, contact Calligraph on (0223) 461143.



Calligraph 600-12: fastest yet

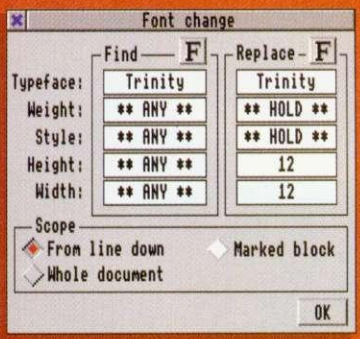
OVERLAY OFFER

IIBIT Education Products Ltd, which manufacturers the A3 Oldham Overlay Keyboard, has combined with Northwest Semerc to discount the latter's overlay software in an offer which appears to save purchasers more than the actual purchase price of the £120 keyboard itself.

BBC Micro owners are being offered discounts of up to £148 on selected overlay programs and Archimedes users can save up to £68. Users of both will save £216 in all. For more details, contact iibit on 081-540 2333.

MEET THE NEW ADDITION TO THE PENDOWN FAMILY

Longman Logotron introduces a brand new word processor, with all the ease of use of the famous PenDown and with powerful new features, including:



FONT FIND AND REPLACE for easy changing of any attributes of a font throughout the document.

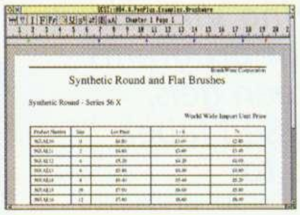
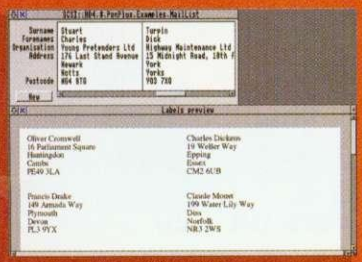
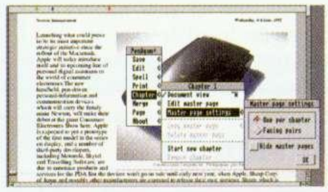


TABLE EDITOR to create, reorganise and perform sum and percentage calculations on tables.

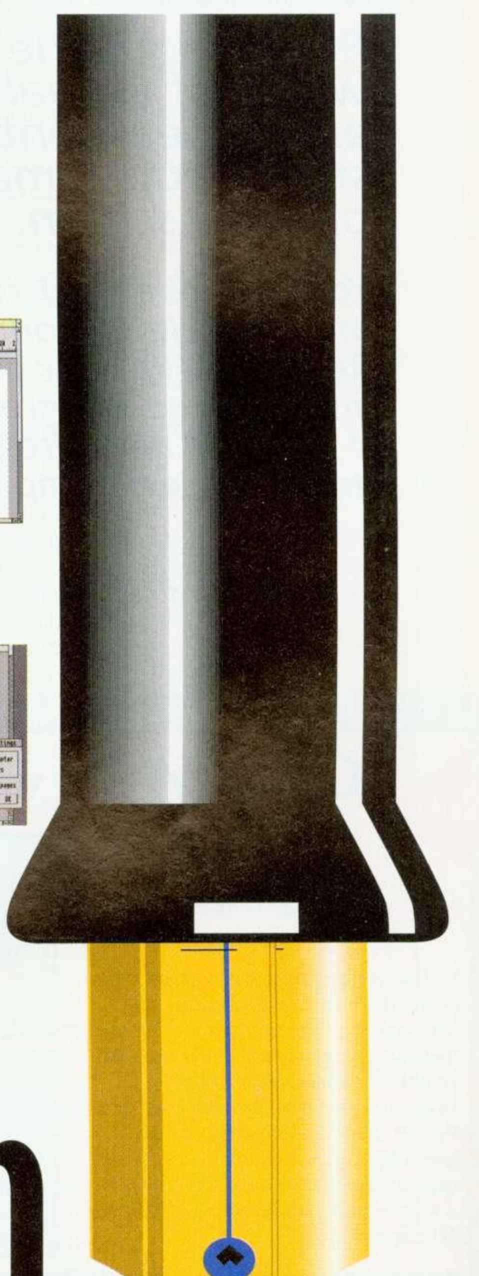


LABEL PRINTING on any kind of RISC OS supported printer.



MASTER PAGES (single or double) and chapters, for creating headers and footers.

ALSO INCLUDES an outstanding new DICTIONARY with over 65,000 words and check-as-you-type facility; MAILMERGE with *!Mail,* a custom name and address database; FLEXIBLE PRINTING CONTROL with automatic booklet printing; CONTINUOUS SCROLLING DOCUMENTS so you don't have to turn pages; VISUAL RULER CONTROL with ruler copy and move; and all the other features which made PenDown easily the top selling word processor for schools.



Archimedes PenDown Plus

RRP £79
Site Licence £400

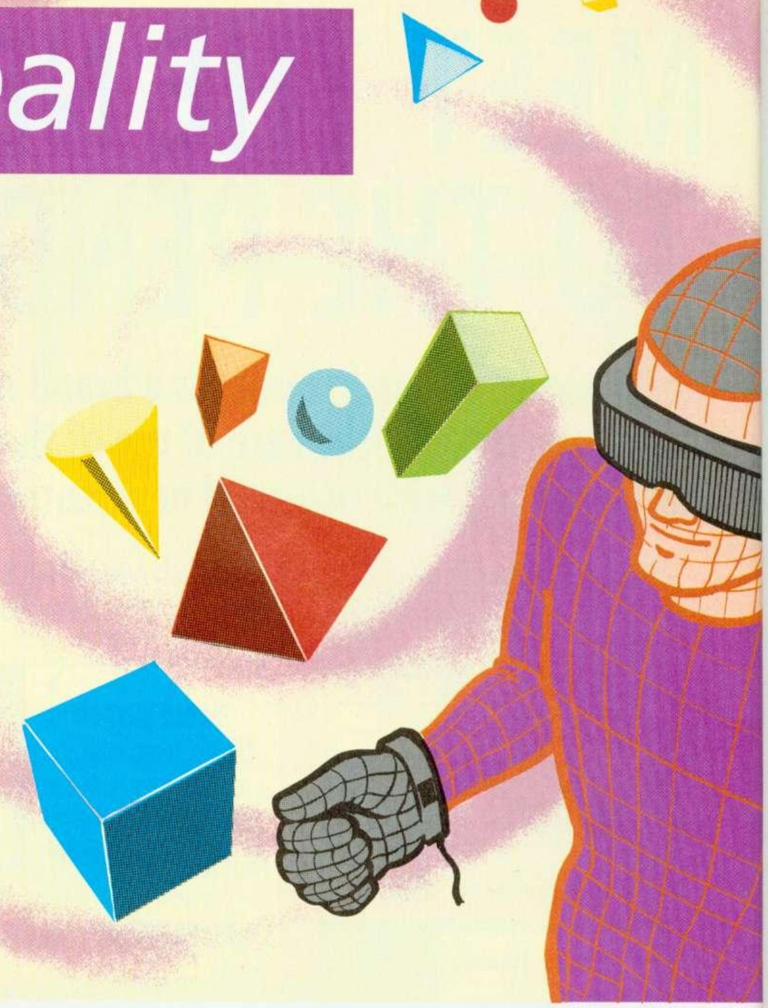
LONGMAN LOGOTRON

124 Science Park
Milton Road
Cambridge CB4 4ZS
Tel (0223) 425558
Fax (0223) 425349

Virtual Reality

Explore New Dimensions...

Read about the exciting world of virtual reality and experiment with stereoscopic images on your screen.



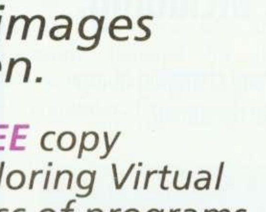
*You can get a **FREE** copy of the article 'Exploring Virtual Reality', a **FREE** disc of programs and **FREE** red and green gels, if you send an addressed label and a 1st class stamp to:*

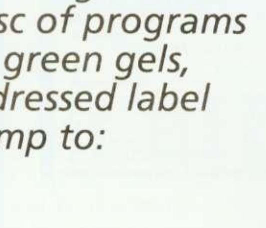
VR Offer, RISC User,
117 Hatfield Rd., St. Albans, Herts, AL1 4JS

NEW

ChartWell Version 1.1

A sophisticated Graph and Chart Package which now offers new features.





Full handling of ***negative values*** in bar charts (both vertical and horizontal), line graphs and scatter graphs. Where negative values are used, the user will be able to choose whether axis labelling appears on the axis itself or at the left and/or bottom edges of the graph display. Bar charts using negative values will have the option of a solid or transparent 'zero platform' for 3D displays.





More ***flexible handling of data*** limits, allowing the user to configure ChartWell for handling more data points than the current fixed limit. Users will now be able to allocate as much of the available memory in their system as they wish for this purpose.

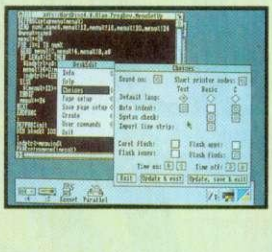
A number of improvements to positioning of labels, titles and values have been incorporated to avoid potential clashes and overlaps which occurred in some circumstances.

Chartwell and manual
Price **£29.95 Inc** + £2 p&p Code **PCHWa**
Version 1.1 of ChartWell is available free of charge to existing users (send the original disc and a SAE marked **ChartWell Upgrade**).

DeskEdit Version 1.20

is a release following a number of glowing reviews in the computer press ... and offers even more features for text editing and word processing tasks, Basic and C source editing.





A new ***single key save-and-run feature in Basic mode*** permits virtually instantaneous testing of programs and applications as you edit them.

The ***improved procedure and function browser*** now lets you browse in both directions

In text mode, ***wordwrap control*** is improved, while in ***C mode syntax checking*** is extended, and a special Search option lets you search for function definitions.

Other ***new features*** are: • dynamic date insertion • Left and Right Justify • bracket matching • Align Columns and • the Char Info option.

...offers much to the user... a good deal of thought has evidently gone into its development...
... a worthwhile upgrade from Edit **Acorn User**

...replete with well thought out and flexible features... very attractive... remarkably inexpensive for what it offers... should prove very popular. **Archimedes World**

...a wonderful piece of software... deserves to be on everyone's icon bar... **Archive**

DeskEdit

is the ultimate all-purpose editor for the Archimedes, with special features for plain text, Basic and C source.

Edit your Basic programs on the desktop and test them inter-actively with a single

DeskEdit + 48 p.e manual + a function keystrip
Price **£24.95** inc + £2 p&p Code **PEDTb**
Existing users may upgrade to V. 1.20 by sending their original disc, together with £2.00 and SAE marked **DeskEdit Upgrade 1.2.**

RISC Developments Ltd. **117 Hatfield Road, St Albans, Herts AL1 4JS. Tel. 0727 40303 Fax 0727 860263**

SHAREHOLDER UPDATE

SILICON Vision has enhanced its package for everyone who holds shares. *ShareHolder Professional* release 3.0 is an enhanced version of the graphical package for monitoring share price data.

Share price sources can be Ceefax, Oracle, Prestel or other viewdata systems. The system can show trends, retail price indices and general market price extensions and more. The program makes full use of the Risc Os desktop. *ShareHolder Plus* costs £275 inc VAT and carriage. Existing users can upgrade for £75 or £125 depending on the original version owned.

Silicon has also revised *SolidTOOLS*, now at release 5.0. Additional facilities include the ability to use all Acorn monitor types, improved image quality from the ray tracing tool and integration with the 24-bit world. The price of *SolidTOOLS 5.0* is £275 inc VAT. Returning your two original *SolidTOOLS* discs means the upgrade will cost £175 inc VAT.

For further details on both packages, contact Silicon Vision on 081-427 5169.



SolidTOOLS offers improved ray tracing

SUPPORT FOR IT

ACORN in Education Centres (AECs) are to be set up by Acorn in conjunction with Education IT Support Centres. The aim of the new centres is to offer specialist IT support to schools using Acorn products.

With AECs, help and advice should be conveniently to hand as it will be available locally. The service should take some pressure off dealers, leaving them to concentrate on their work on installing and servicing equipment.

Acorn hopes teachers will visit the new centres to find examples of Acorn's latest products from multimedia and networking to peripherals and software.

Commenting on the initiative, Acorn's managing director said: 'We are aware that merely providing the computer hardware is not sufficient. It is for this reason that we have defined, as part of our mission, that we will work in partnership with others whose expertise is vital in creating the complete environment for effective use of IT in schools.'

For more on Acorn's new policy, see page 26.

ACORN ROADSHOWS

You might be able to see the new Acorn machines locally if you happen to be near one of the various World of Acorn Roadshows happening between September and December. Dates and venues are:

● SEPTEMBER
Sat 12-Sun 13
National Motorcycle Museum, near Birmingham
Sat 19
Guildhall, Portsmouth
Sun 20
Ipswich Moat House
Sat 26
Savoy Hotel, Blackpool
Sun 27
Hotel Smokies Park, Oldham

● OCTOBER
Sat 3
Last Drop Village Hotel, Bolton
Sun 4
Moat House, Sheffield
Fri 9-Sat 10
Bell Royal School, Jersey
Sat 10
Britannia Adelphi Hotel, Liverpool
Sun 11
Beeches Hotel, Rotherham
Sat 24
Swindon TBA
Sun 25
Ye Old Bell Hotel, Slough
Sat 31
Moat House Nottingham

● NOVEMBER
Sun 1
North Stafford Hotel, Stoke on Trent
Sat 7
Abbey Park Resort Hotel, York
Sun 8
Swallow Hotel, Northampton
Sat 14
Hospitality Inn, Middlesborough
Sun 15
Royal Hotel, Hull
Sat 28
Aston Court Hotel, Derby
Sun 29
Forte Crest, South Mimms
December
Sat 5
The Old Ship Hotel, Brighton
Sun 6
Scandik Crown Hotel,Gatwick
Sat 12
Novotel, Bradford
Sun 13
Leicester Moat House

For more information, contact Acorn's consumer marketing coordinator on (0223) 245200.

SHOWING SOME SPECIAL THINGS

ACORN computers, software and peripherals will star at the Micros for Special Needs exhibition which takes place at the Queen Elizabeth Hall, London, on 13 to 15 October.

The event showcases computer equipment and software for people, both young and older, who have difficulty in using standard 'out of the box' systems. For some exhibitors, it will be a busy week, as *BAU*'s own show starts the day after the Special Needs show finishes.

Here are a few of the familiar Acorn names exhibiting in Oldham; Lindis International will be there to show the TouchWindow pressure-sensitive touchscreen. Silica Software Systems will be showing its easy-to-use *Flare* Risc Os art package.

Longman Logotron's wide range of software titles will also be exhibited. The National Special Needs Software Unit, which became a limited company back in April, will be at the event to show its Concept Keyboard compatible releases. These include *Touch Explorers*, *Kaleidoscope* Curriculum Packs, the Archimedes Big Text Window and scenario designer tools for language development.

Brilliant Computing will be showing a new range of software which uses sound and graphics, plus alternative control devices to the conventional keyboard, to motivate special needs users.

The Scottish Council for Educational Technology (SCET) will, hopefully, be previewing its new disc based Special Educational Needs Database (SEND) for the Archimedes. Showing *Gestalt 2*, a new numeracy skills package for Risc Os, will be Basing Educational Software. The firm's software is recommended by the British Dyslexia Association – which also has a stand at the show.

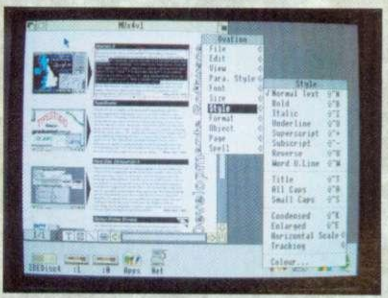
Penny & Giles Computer Products will be showing a variety of computer input and control devices for people with motor control problems. Another highlight will include a special computer called ORAC developed by Lancaster University. This box of tricks has both human voice and synthetic speech facilities and is designed for helping people with speech impairments who also cannot use a keyboard.

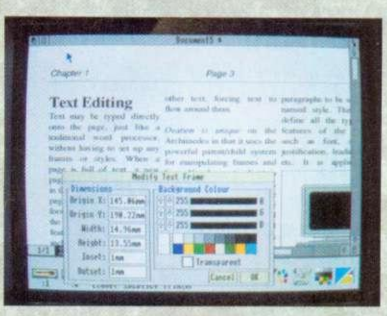
The Micros for Special Needs Exhibition looks like it will be well attended and well worth a visit for anyone involved in this area.

NEW

Ovation 1.30

Announcing a major new release of the highly acclaimed desktop publisher





Ovation is the easy-to-use desktop publisher used on thousands of sites in education and business across the country. Now, in response to customer feedback, it has been enhanced with many new features, setting even higher standards of quality and value.

Still only £99

Ovation is packed with professional features, yet remains easy-to-learn and instinctive to use. It provides a complete solution for all document generation; from simple single page letters to entire books with diagrams and scanned images.

For the users convenience, Ovation is NOT copy protected.

Upgrade to version 1.30

Upgrade to version 1.30 for just £5 + VAT + £1 carriage (£6.88 inclusive). Please return your original program disc to the address below. A site licence upgrade is available costing £15 (£18.63 inclusive).

New features include

- ❑ Mail merge—Ovation documents may be merged with CSV files generated by databases and other applications
- ❑ Pamphlet printing—scaled and rotated printout for printing booklets with correctly ordered pages
- ❑ Rotated pictures—draw files may be rotated to any angle (also Sprites if you have RISC OS 3.0)
- ❑ 1st Word Plus import—1st Word Plus files may be imported with style information directly into Ovation
- ❑ Thesaurus hotlink—automatic transfer of words between Ovation and latest Desktop Thesaurus (version 1.10)
- ❑ Draft printing—fast draft printing via RISC OS printer drivers
- ❑ System font—easy-to-read non anti-aliased system font in four weights (medium, bold, italic and bold italic)
- ❑ RISC OS 3.00 compatibility—rotated text in Draw files, 256 grey-level sprites and the desktop boot facility

TypeStudio

The flexible text effects package



TypeStudio is a complete text manipulation package ideal for producing professional quality adverts, posters, banners, logos, letterheads etc.

Drawing tools allow lines and curves to be drawn to create almost any shape, along which text can be flowed. Pairs of lines may be linked to create shapes into which text and Draw files may be moulded.

Only £45

A range of special effects are available, including: shadow, slant, 3D and mirror.

- Flow text along straight and curved paths
- Mould text and Draw files to shapes
- Wall floor and graduated shadows
- 3-D, mirror, slant and plinth effects
- Save in internal and Draw file format
- Print using RISC OS printer drivers
- Grid and zoom facilities
- Copy, rotate and magnify
- Import Draw files as moulds

The package includes 7 fonts and a 64-page user guide containing many worked examples.

'Of the three (packages), TypeStudio is the most comprehensive. All the tools you are likely to need are included and there is no need to use any other application with it.' *ACORN USER May 92*

Desktop Thesaurus

New Version

New, bigger thesaurus with hotlink to Ovation



Desktop Thesaurus now contains over **13,750** keywords and nearly **135,000** synonyms. It is ideal for developing language skills in the office, in school or at home.

Only £19

Ideal for use with Ovation, Impression, Pipedream, Edit, 1st Word Plus and other desktop publishers and word processors.

- Synonyms are grouped by noun, verb etc.
- Single click to browse through synonyms
- Data compressed to save disc space
- Chosen synonyms may be transferred instantly to other applications

Upgrade to version 1.10

Upgrade to version 1.10 for just £2 + VAT + £1 carriage (£3.35 inclusive). Please return your original disc to the address below.

'...works both speedily and painlessly. This one is recommended.' *ARCHIMEDES WORLD Jul 92*

RISC developments

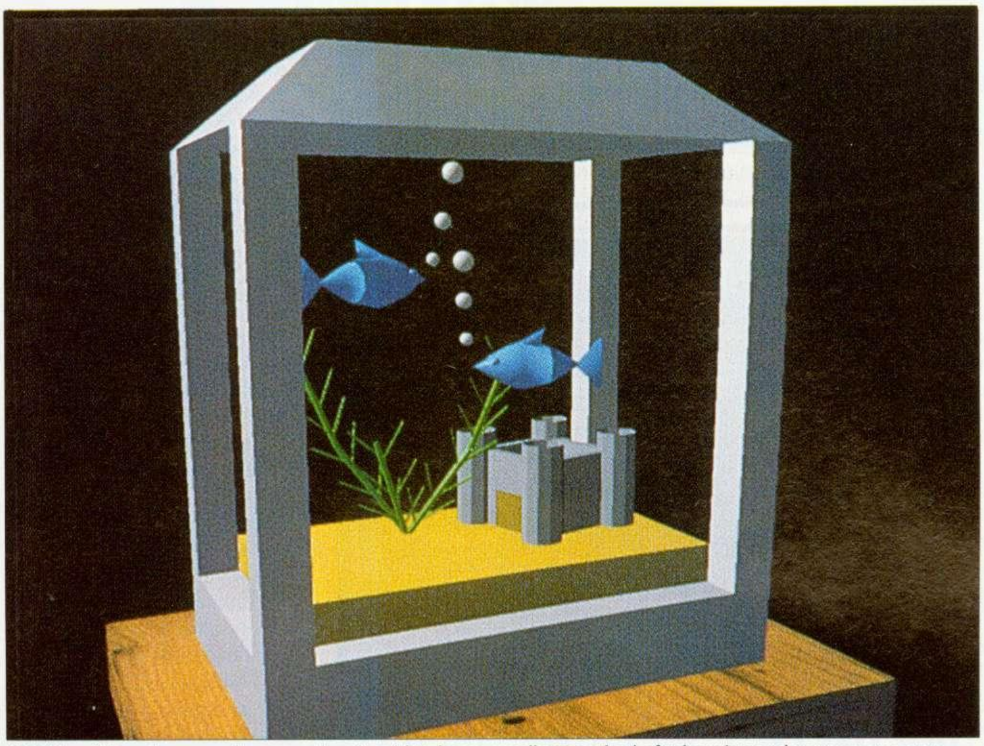
RISC Developments Limited. 117 Hatfield Road, St. Albans, Herts. Al1 4JS. To order, or for more information, call (0727) 40303

All software is suitable for Archimedes, A5000 and A3000 systems with 1Mb RAM and RISC OS 2.00 or 3.00.

Please add VAT to all prices and carriage of £3.10 for Ovation and £2 for other products.

All prices are for single user versions—site licence prices available on request.

THANKS FOR ALL THE FISH



Watching fish swim around an aquarium is said to be an excellent method of relaxation and you can even get 'simulated aquarium videos. However, *BBC Acorn User* can go one stage further, with completely stationary fish – you don't even have to move your eyes with this month's picture from Jon Veck. *Pisces* was created using Clares' *Illusionist* package and tidied up using Longman Logotron's *Revelation 2*. Why not try your hand at computer art? A £15 prize goes to any picture published on the Graphics Page. Please include details of how you created the picture and any other relevant information. Send your entries to the usual address.

MAKING THE SHADE

Arxe's *PowerShade*, the Risc OS ray tracer based on *RayShade*, is nearly complete and may appear at the *BAU* show.

At present, *PowerShade* requires script files to describe scenes for ray-tracing, but a full 3D editor is to be included, with an application to convert existing *Euclid* files into *PowerShade* script files.

Compared to other ray-tracing programs for the Arc, *PowerShade* runs incredibly fast and can produce a full Mode 28 (800×600) picture in about two hours.

A scene in *PowerShade* can be frozen at any point during rendering and stored to disc, and at a later date resumed. Being a true Risc OS program, *Powershade* will happily operate in the background, allowing other applications to multitask alongside it.

PowerShade shares many of *RayShade*'s features including, texture and bump-mapping. The former allows you to take a sprite and wrap it around any object or project it onto any surface. Bump-mapping lets surfaces have ripples rather than being completely smooth, which works particularly well for water effects.

As well as producing pictures in any 256 colour mode, *PowerShade* can generate full 24-bit colour images using the standard RGB file format found in other Archimedes graphics applications. These files can then be displayed via a suitable graphics card such as PCATS or StateMachine's G8 graphics accelerator.

PowerShade is expected to retail at £100. It will include a number of utilities and some example files. Two manuals are also included.

For more details, contact Arxe Systems Ltd on 081-534 1198.

NEW CARD

StateMachine is a new company set up by ex-Computer Concepts hardware designer, Chris Honey, to design and develop innovative products for Acorn 32-bit computers.

The company's first product will be the G8 graphics accelerator, which can select any 256 colours out of a palette of 16.7 million.

TV studio graphics can be generated with support for CCIR (768x576 PAL Interlaced Standard) in 256 colours.

Two versions of the G8 will be available. The standard G8 at about £249+VAT, supporting resolutions of up to 1024×768, while the G8+, at £299 +VAT, will provide modes up to 1280×1024. A number of other new Risc OS modes are provided, including a 256-colour version of Mode 31.

For further details, contact StateMachine on (0582) 484266.

NEWS IN BRIEF

● After months of tweaking, *ArtWorks*, the much-talked-about graphic design package from Computer Concepts, is ready for release. Although the original version shown at last year's *BBC Acorn User* show contained most of the planned features, there has been considerable refining of the user interface.

The finished version will now include a number of new features, such as layers and blending. Much work has gone into the 'look and feel' of the program to ensure that the final release is as close to perfection as possible.

● Acorn has hinted at 24-bit colour graphics for the next generation of Acorn machines. According to rumours circulating at a recent Australian convention, Acorn is currently working on and developing the new technology.

Twelve months is expected as the minimum 'gestation period' so don't expect anything until the end of 1993.

● The increasing popularity of desktop publishing on the Archimedes has led to the establishment of a number of specialist print bureaux that cater for those who require professional output of their documents.

By using a bureau, anyone can produce full colour documents from their Archimedes. All that's needed is a colour Postscript file which can be generated using the Risc OS Postscript printer driver. This file can then be used directly by a bureau.

Most bureaus cater more for the PC market, so the file should be transferred onto a PC format disc. This can be done usingArxe's *MultiFS*, for example, or directly using Risc OS 3.

Arch Images are a new print bureau specialising in the Archimedes. They can be contacted on (0733) 375424.

● Any graphics news, views or comments are welcome. Please write to The Graphics Page, BBC Acorn User, Redwood Publishing, 101 Bayham Street, London NW1 0AG.

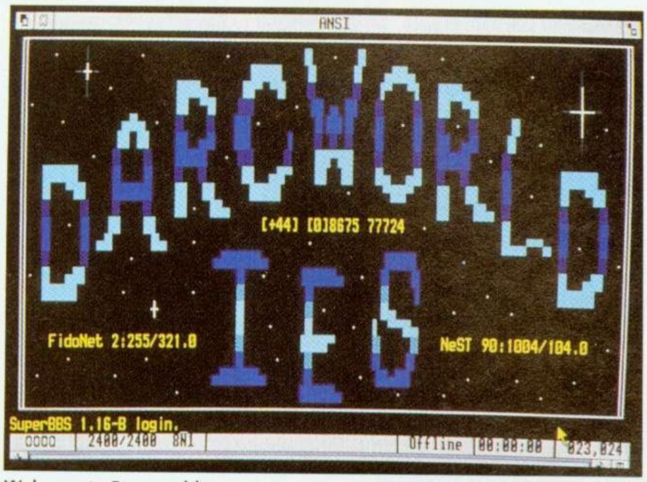
DARCWORLD IN THE SPOTLIGHT

DarcWorld IES has been online for a couple of years, and is run by Tom Crossland in Oxford. Although it runs on a PC using the Finnish *SuperBBS* software, DarcWorld has a good range of message and file areas of interest to Acorn users.

As well as having a full Acorn Support Area, it features a number of special interest groups, ranging from computing and communications, through science and gaming, to sound and music. Each has further sub-divisions, many of which connect to FidoNet echomail conferences. The Gaming area offers multi-user online games, such as Chess and Global War, which can be carried on, both online and from call to call.

The file download areas draw from about 100Mb of material, and they cover comms reference texts, language source code, ANSI, JPEG and other image formats, and a full range of programs of all kinds: games, utilities and business, for the Archimedes and eight-bit Acorn machines, PC, Amiga, and Atari.

DarcWorld IES is on (08675) 77724 for 24 hours a day, at speeds from V21 to V32bis 8-N-1, and is on FidoNet as 2:255/321.0.



Welcome to Darcworld

CALLING THE WORLD

The InterNet is a vast international network of computers used by educational, commercial and other users for sharing and spreading information. There are an enormous number of excellent free and shareware programs in publicly accessible archives on the Internet, as well as access to all the Usenet newsgroups – (about 3,600 conferences covering everything from Acorn computers to Frank Zappa) and worldwide realtime access to about half a million computer sites. For instance, you can get free access to the NASA Extragalactic database, download files from McGill fileserver in Canada and play a multi-user dungeon game in Texas.

Connecting to InterNet isn't like logging onto a BBS with a modem. Instead it uses a protocol called TCP/IP, which transfers characters in packets around the network. You type commands at your computer and they are dispatched onto the network as packets with the name of the 'target' computer on them. The packets are passed from node to node around the world, until they reach their destination, where the process is repeated by the remote computer to send a response back to you.

To get started you will need some comms software which supports TCP/IP. Archimedes owners availing themselves of this service can use a PD program called *KA9Q* written by Phil Karn (a packet radio enthusiast), ported to the Archimedes by Jonathan Naylor. The PC version of *KA9Q* does work under the PC Emulator on an Arc, albeit rather slowly. You will also need access to an Internet gateway like that recently introduced by Demon Systems.

The cost of the Demon Internet Services subscription is £38.19, including £22.50 joining fee and VAT. For this you get electronic mail to anywhere in the world, a full UserNet news feed and access to thousands of computers around the world. For further information contact:

Demon Systems Limited
42 Hendon Lane
Finchley
London N3 1TT
Tel: 081-349 0063

HERE, FIDO

To send and receive messages over FidoNet, a BBS node needs to establish connection with a source of message distribution – called a 'Hub' system. A FidoNet Hub BBS system has the responsibility, under the Host, for distributing messages to individual nodes.

When a BBS becomes a full FidoNet node, it guarantees to be available to the Hub for calls during the time allocated for FidoNet message exchanges. Even though 'National Mail Hour' is 02.30 – 03.30 in the UK, dedicating a phone line for the BBS may not at first be possible. The alternative is to become a 'Point' BBS, communicating only with your 'Boss' BBS – a full node. FidoNet recommends a prospective BBS becomes a Point first.

Netmail and Echomail for the Point are held by its Boss, and the Point dials in at a convenient time to access them. Sysops can often offer a 'Point Kit' – PD software and/or a FidoNet mailer needed to run a Point off a full node plus a 'Point Number' based on the Boss's node number.

NEWS IN BRIEF

● The Power House, run in Chester by Edward Hobson, has extended its support to V32bis, courtesy of a Miracom Everest Dual Standard Modem now installed on the new second line. The new Everest Modem also restores V23 to the range of available speeds.

The Power House numbers are: (0829) 782676 : 300-14400 HST, V42bis, MNP5 no V23
(0829) 782667 : 300-14400 HST, V32bis, V42bis, MNP5

● Bob Voisey, pioneer of Arc bulletin boards and sysop of The Noah Conferencing System and its earlier incarnation, Noah BBS, has announced he is closing down TNCS and leaving the world of dial-up comms. We are very sorry to see him go. Noah BBS was one of the earliest Arc-run BBSs, and Bob helped enormously in the development of Hugo Fiennes' *ARCbbs* software. We wish him well in his next field of activity.

● Last chance to call up HealthData in its present form – ViewData-only V23 (1200/75) on 081 986 4360. Over 400 health topics are covered by online and downloadable text files, and HealthData also features a news section. Chris Dobbing has been running the system on two trusty BBCs since 1985. Later this year he is upgrading Healthdata to a scrolling service running *ARCbbs* software on an Arc.

● Free Tickets! *BAU* has donated ten of its show tickets, worth £5 each, to Arcade BBS and they can be won in a simple on-line competition. Old and new users are invited to log on and enter. Send your answers on-line to the sysops – please do not send them in to the magazine. The ten winners will be drawn from a hat containing all the correct answers received by 9 October 1992, which will be announced on Arcade. The numbers to call are shown below. Non-winners can still buy tickets by phoning Safesell on (0737) 814713.

● Contact me with any news or information at: David Dade, BBC Acorn User, 101 Bayham Street, London NW1 0AG

. . . or by modem on Arcade BBS: User #2 on 081-654 2212
or 081-655 4412

Diamond Drives

A3000 30Mb Internal IDE Drive

£199.00

With User Port

FOR FULL RANGE SEE HCCS PRODUCT GUIDE

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575-583 DURHAM ROAD, LOW FELL, GATESHEAD,
TYNE AND WEAR. NE9 5JJ. Tel: (091) 4870760 Fax: (091) 4910431

VISA

HCCS

PRODUCTS

		✓
A3000		
Hard Disc Drives		
45Mb External	£399.00	❒
100Mb External	£479.00	❒
200Mb External	£889.00	❒
HardCard45	£329.00	❒
HardCard100	£429.00	❒
30Mb IDE Internal with User Port	£199.00	❒
Memory Upgrades		
1Mb RAM	£45.00	❒
1Mb Expandable	£49.00	❒
2Mb to 4Mb for above	£129.00	❒
4Mb RAM	£149.00	
Interface Products (Internal)		
Econet	£35.00	❒
Serial Upgrade	£19.00	❒
User/Analogue Podule	£44.00	❒
User Port	£33.00	❒
TV-Modulator Podule	£39.00	❒
Second Drive Interface	£24.00	❒
Get Control Pack	£69.00	❒
Mono Vision Digitiser	£49.00	❒
Colour Vision Digitiser	£79.00	❒
Interface Products (External)		
Podule Case	£15.00	❒
Mono Vision Digitiser	£62.00	❒
Colour Vision Digitiser	£92.00	❒
A300/A400/A5000		
Hard Disc Drives		
45Mb External	£399.00	❒
100Mb External	£479.00	❒
200Mb External	£889.00	❒
45Mb Internal	£289.00	❒
100Mb Internal	£369.00	❒
200Mb Internal	£779.00	❒
Memory Upgrades		
1Mb RAM for A400	£45.00	❒
2Mb RAM for A5000	£89.00	❒
Interface Products (Internal)		
*Second Drive Interface	£24.00	❒
Econet	£35.00	❒
Mono Archimedes Vision	£49.00	❒
Colour Archimedes Vision	£79.00	❒
*Not for use with A5000 or A300		
Book (no VAT)		
'Control On The Archimedes'	£9.95	❒
Please send a free HCCS Product Guide		❒

SUBTOTAL £
V.A.T. (17.5%) £
TOTAL £

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ADDRESS:

POST CODE

VISA or ACCESS WELCOME

EXPIRY DATE /

Please photocopy this order form if desired

HCCS products available from all good Dealers

All prices excluding VAT.
Postage and Packaging free.
E&OE



Four new machines! Three separate markets. Graham Bell looks at Acorn's all-encompassing launch

AN ACORN FOR EVERYONE

The A3000 is dead. Long live the A3000. Except that the old A3000 itself isn't quite dead yet. And the new one – is it a real king or just the old emperor in new clothes?

Such was the wide appeal of the A3000, that Acorn has revamped it into not just one, but three separate machines, each aimed at a specific segment of the computer-buying public. This is a very new approach for Acorn, and it is even planning a TV advertising campaign for one of the range, the A3010.

The A3010 is Acorn's family machine, or what is known to the rest of us as the games machine. It is something more than a console but is aimed at many of the same people who currently buy Amigas.

By contrast, the A3020 is a product to satisfy Acorn's traditional buyers in primary and middle school education.

And the third machine, the A4000, is tailored to the needs of small business and the more experienced end of the home computer market. Acorn have given it the title 'home office'.

All in all, Acorn has completed its cycle of product renewal in less than a year: the PC-style technology of the A5000 has been passed on to a new range of micros that will effectively replace the aging A3000. Then there is, of course, a fourth machine, the Acorn Pocket Book.

NEW A3000 SERIES

Outwardly, the A3010 and A3020 manage to look remarkably different from each other and from their predecessor: smaller, more rounded, less fussy than the A3000. They look considerably smaller, although in fact the depth of the machine has only been reduced by a few centimetres. The case itself is a light plastic moulding, but the machines feel extremely heavy for their size. While the A3020 retains the established BBC and A3000 colouring of a cream case, with mainly grey keys and the function keys in red, the A3010 is a bit of a novelty: the case is a lightish grey, with the function keys in a distinctive green. Certainly, this will help to differentiate the models.

Apart from colour, most of the external features of the two machines are identical. The keyboard is the usual Acorn style – light and a little flabby, without a positive key click – though it does have real springs like an A5000, not the tiny rubbery gaiters of earlier Archimedes keyboards or the membrane affair of the A3000.

To the right-hand side, there's a 3.5in high-density floppy disc drive, which can read all Risc OS disc formats up to 1.6Mb, as well as PC formats up to 1.4Mb. To the left, a single small hole gives access to the reset switch – you need something pointed to press it.

Around the back is the main array of connectors. Both machines have the mouse, stereo headphone, monitor, parallel and serial port connectors that you would expect: all are compatible with their A5000 equivalents. But the

machines differ, in that in addition to its monitor connector, the A3010 also has a TV port, in keeping with its games machine image. And there are two joystick ports, to which you can connect Atari-style joysticks.You can connect the PAL TV output directly to the aerial socket of the family television, rather than using a monitor. Though the display quality will always be better on a dedicated monitor, tuning your television to channel 36 should give an acceptable picture on a modern television. However, it wasn't possible to test this out for the review.

The A3020 lacks these game-oriented items: it is monitor-only, though of course you can connect up anything from a standard monitor to a PC-style VGA monitor or even a multisync: the only difference is that you get a different selection of screen modes available. And in place of the two joystick ports, the A3020 has a single nine-pin D port that is a new style of network connection. Acorn intends that this will be used for your choice of Econet or Ethernet: the same connector is used, but you fit a different interface card inside the computer. The A3010 cannot be connected to a network in this way.

THE FAMILY MACHINE

The A3010 is Acorn's first foray into the mass market with what looks like an out-and-out games machine. Joystick ports, a TV modulator and a strict limit on expansion (2Mb of Ram and no hard disc) means that this machine isn't really suitable for most of Acorn's existing market. However, it must be viewed as a 'games machine plus' – it really isn't competing with the Nintendo and Sega consoles whose champions Mario and Sonic will battle at Christmas this year.

There are two A3010 bundles – the Family Solution and the established Learning Curve package. Each contains the A3010 itself, the *Easiword 2* word processor and a single game (currently the Olympics tie-in *Quest for Gold*, but slated for a change before Christmas). The Family Solution is a bare-bones package, which is intended for use with the family television, whereas the Learning Curve comes with a monitor and 2Mb of memory already fitted, and also the PC Emulator software.

It remains to be seen whether the 'games machine plus' market still exists. Although the Family Solution bundle looks better value than has been available before in the Archimedes range, a retail price of £499 is certainly still not rock bottom. An Amiga A500 or A500 Plus, after some recent price cuts, now comes in at £299. And for a family that's new to computing, and who originally went to Dixons looking for a bargain games console for £150, it means tripling their budget. Of course, there are some unique advantages – the performance, the graphics, the sound, Risc OS itself, and some fine application software. But it seems likely that the new range will continue to sell only to the more knowledgeable, sophisticated and educationally concerned parents.



Inside the case, the reason for the weight is immediately apparent: sheet metal shielding covers almost everything. Two cutouts in the shields give access to the bay at the rear for fitting a podule and to the front (under the keyboard) for adding memory upgrades, without dismantling the whole lot. But it does come apart, to reveal an impressively bare circuit board.

On the board, there is remarkably little. To the left is the power supply: there is a captive main lead but sadly no switched mains output for powering a monitor. In the centre of the board is the Arm250 chip that powers the whole new A3000 series. And to the right is the floppy disc drive. Under the floppy disc is a space for a 2.5in IDE hard disc, and a 60Mb Conner drive is an option on the A3020.

On the A3010, the space remains unused. Under the keyboard at the front of the machine is the Ram array, 1Mb in the A3010 and 2Mb in the A3020. And next to this is the single speaker: although it's a little muffled by the keyboard, the sound is less tinny than on the A3000.

All the new machines come with Risc OS 3, version 3.1 as used in the A4 portable. And Acorn is also releasing this as an upgrade for existing Archimedes owners, including A5000 machines that have version 3.0.

The Risc OS 3 Roms contain not just the operating system, but also: several of the core applications including *Draw*, *Paint*, *Edit* and *Alarm*; the font manager and Trinity, Homerton and Corpus outline fonts; and a number of commonly-used modules like the shared C Library (*CLib*) and the floating point maths package (*FPEmulator*).

Keeping all of these in Rom means that they do not take up any of that valuable Ram space, and in turn this means

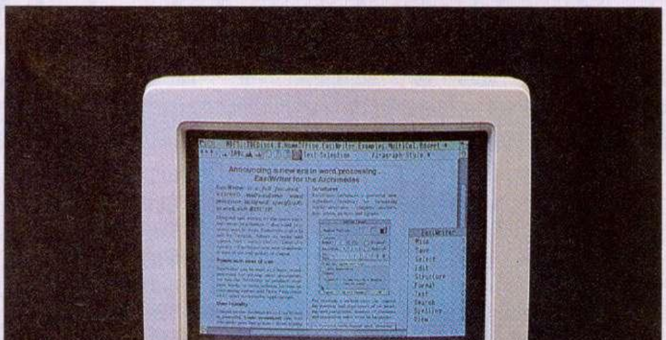
THE HOME OFFICE

So who is the A4000 aimed at? Clearly, secondary education, by default, forms a big part of its intended market, but its three-box format and bundled businedd software makes it quite clear that this is an office machine.

European regulations specify that computers used at work should have separate rake-adjustable keyboards and other details, so the A3020 and machines like it won't be suitable platforms for business use.

In spirit, at least, the same regulations are just as applicable to school computers, at least in cases where individuals are expected to work at the keyboard regularly for more than a couple of hours a day.

The A4000 will make an excellent business machine, particularly in a network with a few A5000 machines doing the more demanding jobs.



THE EDUCATION MACHINE

With the A3000 the most popular new computer for schools, any potential replacement has to be a carefully assembled package that retains substantially all the features of the old machine.

The A3020 is unashamedly an education machine – right down to the established cream and red livery. So what do you gain? First, performance – the A3020 is some 50 per cent faster than the old machine, making the new machine fly even in high-resolution screen modes. You gain a high-density floppy disc drive, plus the option of an internal IDE hard disc without compromising the internal mini-podule expansion. You gain a choice of network standard – Econet or Ethernet – also without taking up your mini-podule space. You gain an extra megabyte of memory as standard, ensuring that even the basic machine is fully capable of multi-tasking two or more substantial applications. You gain a serial port – which was an option on the A3000. You gain Risc OS 3, which while remaining true to its predecessor, is certainly a step forward. And you gain on price too.

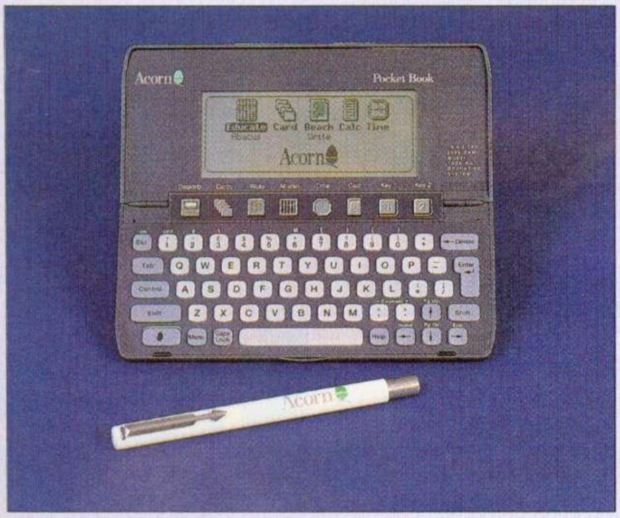
On this scale, losses are minor but significant. You lose some of the potential for expansion, as there is no external podule bus. And you lose the opportunity for a mid-life speed boost – some A3000 owners have added Arm3 chips to their machines, but it just isn't possible to uprate the Arm 250 like this. And you don't get the games-oriented features of the A3010 – the TV modulator and joystick ports, but do get the option of networking the machines to Econet or Ethernet.

For the majority of schools, these objections are hardly serious, and with the A3020, primary and middle school needs are clearly well met. High schools, however, may be looking for something with a little more beef: a jumbo-sized hard disc, the ability to run a direct-drive laser printer perhaps, or a choice of video and scanner add-ons. The expansion potential of the A3020 is limited to the single internal mini-podule – though if you fitted a SCSI card, then you could cover most needs. But a second factor is that a more business-like appearance and a separate keyboard are highly desirable with older school students, and so the A4000 and A5000 are probably more suitable.



POCKET POWER

As far as we know, Acorn is the first company to secure a badged version of the Series 3 from Psion. Acorn's logo isn't the only change to the Pocket Book over the Series 3 original. The file transfer system, developed by Computer Concepts for Acorn, makes the Pocket Book's files appear as the contents of an ordinary looking file directory on the Risc Os desktop. Files can be manipulated in the normal way by mouse selection, dragging and dropping. Other built in applications include an word processor, database, spreadsheet, calculator and an alarm. The Pocket Book has 256K Ram as standard and shares all the Series 3's expansion peripherals. Pricing is similiar to that of the original Psion.



that even a 1Mb machine is fully capable of multi-tasking – for example, you can run applications like *Impression*, *Draw* and *Paint* together – which was not a possibility on the original A3000.

The A4000 is the third component and it really is 'just' an A3020 in an A5000-style box, intended to bridge the gap between the two ranges.

THE A4000

The strengths and weaknesses of the A4000 mirror those of the A3020: Arm250; 2Mb of memory, upgradable to 4Mb; an optional internal hard disc; a single expansion card. It's important to note that it still takes A3000-style mini-podules, not the full-size affairs that fit A5000s. The sole difference inside is that the hard disc is a 3.5in 80Mb IDE unit, not the 2.5in discs that fit the A3020.

Acorn is also planning to bundle software and a monitor with the A4000 – the Home Office package includes the machine and a monitor, plus *Easiwriter* version two (not *Easiword* as in the A3010 bundles), Iota's *Desktop Database* software and the latest version of the PC Emulator. This is intended for the more computer-literate family.

The A4000's obvious competition is the A5000, but a similarly specified machine tots up to about £500 more. For this premium, you get the higher performance of a 25MHz Arm3 processor, the chance to add the floating-point accelerator chip when this becomes available, and much greater expansion potential – four podule slots rather than the single mini-podule of the A4000. You can fit a second floppy or hard drive inside the A5000 without trouble. But for all but the most demanding and technical of home users, the A4000 provides all that's necessary – particularly if the mini-podule you select is a SCSI interface.

The basic A4000 works out at only £50 or so more than the A3020 itself – that is certainly money well-spent. Given this, and its obvious good looks, the A4000 could turn out to be the star of the range.

PRODUCT DETAILS

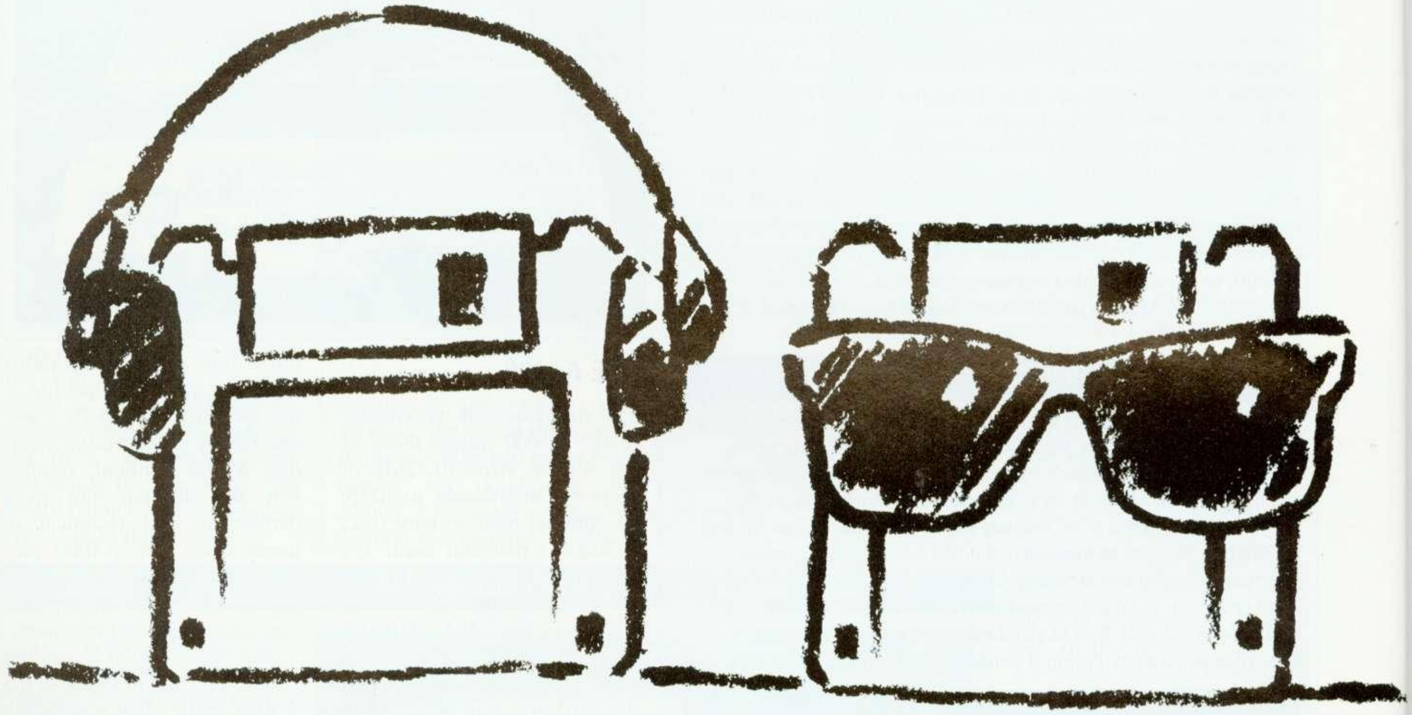
A3010 Family Solution (1Mb Ram, Easiword, one game): £499. A3010 Learning Curve (2Mb, Genesis collection, parental guide, PC Soft): £799.

A3020 basic system (2Mb Ram, 1 floppy plus Acorn CGA monitor): £880.08. With 60Mb hard disc: £1056.33

A4000 Home Office system (2Mb Ram, 80Mb hard disc, Acorn CGA monitor plus Easiwriter and Desktop Database): £1173.83. Without software: £1115.08

Acorn Pocket Book: 249.95.

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ZOOMING IN

Graham Bell lifts the lid on Acorn's new technology

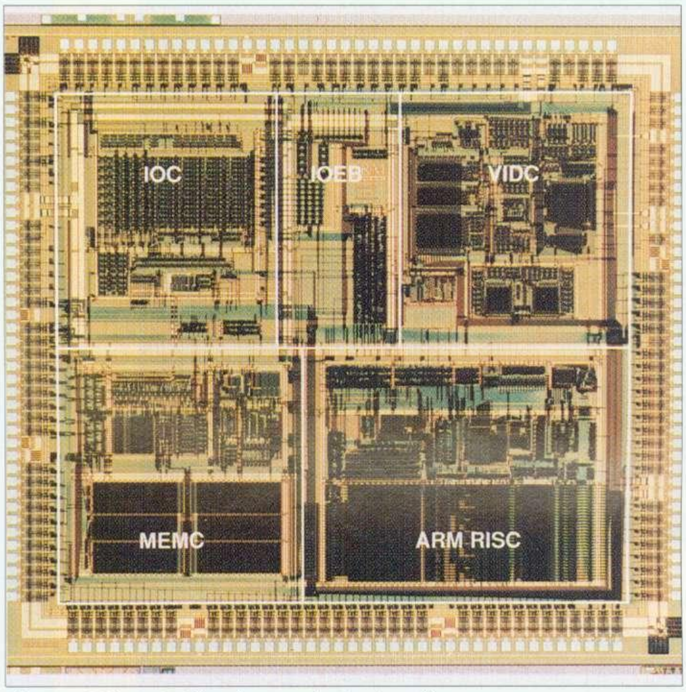
Acorn's new micros are all developments of its well-established and proven technology. However, they do differ from their predecessors in a number of ways. Most significantly, all three new machines are based around a new chip from Arm Ltd known as Arm250.

The Arm250 is most simply described as 'an Archimedes on a single chip'. It contains all of the workings of an Arm2 Risc processor chip, as used in the original 1987-vintage Archimedes A310, and in the A3000, plus the three other main chips in the Arc chipset – Vidc, Memc and IOC.

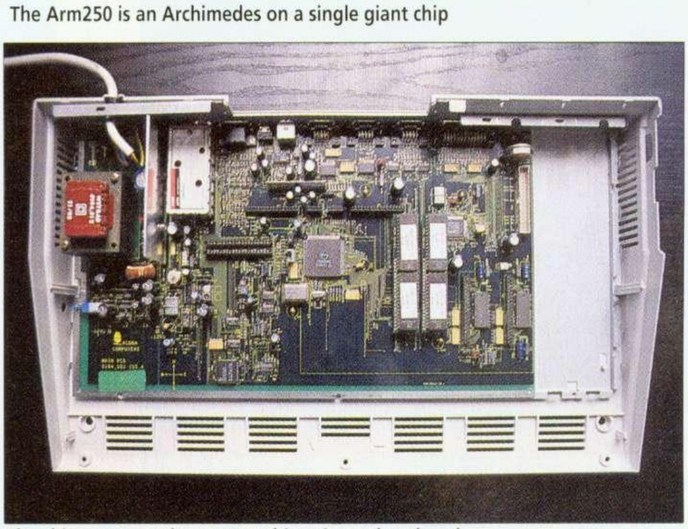
All four remain essentially unchanged, but are integrated into a single giant chip. In fact some of Acorn's pre-production A3010 machines contained carrier boards fitted out with separate Arm, Vidc, Memc and IOC chips, rather than 'real' Arm250s. The only substantial difference from the Arm3 is that the Arm250 is fabricated using slightly larger scale integration, although the basic 1 micron technology is the same. This means that because the components are closer together, the clock speed of the system can be ramped up a bit.

This means the Arm250 is still a fairly conservative design. It lacks the read cache that boosts the performance of Arm3. It runs at only 12MHz, and none of Arm Ltd's most recent improvements from the Arm6 family – full 32-bit addressing and a write buffer for example – have been incorporated into the chip.

The Arm250 is carefully tailored for the needs of the new A30X0 range and no more. It exemplifies Arm Ltd's 'pic 'n' mix' approach to chip design: using several standard building blocks, a processor core and whatever 'off the shelf' cache, memory management or other units are needed to assemble a chip that meets the needs of the system. In many ways this turns computer design on its head – computers used to be assembled around a processor, but here the processor is designed to fit inside the computer.



The Arm250 is an Archimedes on a single giant chip


The chip count on the new machines is much reduced

Aside from the Arm250, the new machines contain only six other significant chips – two of these make up the complement of 1 or 2Mb of Ram in the front right-hand corner (see picture above), and another two are the Risc OS 3 Roms.

The Ram in the new machines has an 80ns access time, in comparison to the 125ns access time chips in the A3000. And this means that the memory system can be run at 12MHz rather than the 8MHz of the A3000 – which, in theory, gives an immediate 50 percent speed boost.

The remaining two chips are an Intel keyboard controller and a Chips and Technologies 82C711 PC-World chip. The latter looks after the parallel port, serial port, the clock and Cmos Ram, the floppy disc drive and the IDE hard disc. It's the same chip used in the A4 portable and a slightly updated version of the 710 used in the original A5000.

Using the 711 means that both the parallel port and the serial port are fully PC-compatible, so the parallel port is two-way. That means that you could use the parallel port to connect up items like scanners, with the appropriate software, and some manufacturers are already doing parallel port versions of their add-ons.

Also on the main board are connectors for Ram expansion – whatever you have can be doubled – and for the expansion card. This is exactly the same as the mini-podule connector in the A3000, and almost all existing expansion cards will work in the A3010 and A3020. The compatible range includes both A3000 SCSI cards and cards containing a tiny hard disc drive. This is the only way to add an internal hard disc to the A3010, as the IDE connector used on the A3020 is missing. You can easily fit an existing ICS Idea drive, but Beebug's current hardcard is slightly too big to fit within the metal shielding. No doubt this small problem will soon be remedied.

Along the rear of the circuit board is where the two models differ most. The A3010 has its TV modulator and joystick ports, and the A3020 has a connector for a network card. There are two new designs of card, one of which is for Econet and one for Ethernet, but only one network card can be fitted. The final difference is that the A3020 has an IDE connector so an internal hard disc can be fitted.

The interface card can be used on any RISC-OS based machine fitted with a standard expansion slot. This means that when you upgrade your machine your SCSI setup can go with you.

*Our installation software makes setting up your system a piece of cake. Instead of messing around with *commands once your interface card and device are connected you simply run a single piece of software, give a quick Ctrl-Reset and off you go. We also include one or two rather useful utilities which give detailed information about the devices attached to your system and the speed at which they operate, together with a very comprehensive manual.*

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Minimum system requirements

- ❑ *Acorn ARM based computer*
- ❑ *Acorn RISC OS 2 or 3*
- ❑ *1MB RAM*
- ❑ *Standard Acorn expansion slot*

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	All RISC-OS computers†
Standard card**	£149.00
Cached card**	£199.00

SCSI Cables

Internal SCSI cable	£7.50
External SCSI cable	£15.00

All systems (i.e. interface and device) include all necessary cases, cables and software

A3000 Expansion options

	A3000 only
Analogue & User port	£59.00
1MB memory upgrade	£59.00
1MB expandable memory upgrade	£69.00
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ALL CHANGE

Acorn have reorganised their education plans, with new advice centres and special dealers. Peter Talbot explains the thinking behind the change

Anyone who works in education these days is only too familiar with the new jargon words, like re-structuring and re-organisation. Everything in education seems to be changing, not least the old LEAs and IT centres and so it is only fitting that Acorn should follow suit with a re-structure all of their own.

In the week that the White Paper for education was announced, Peter Talbot, the face behind Acorn's education marketing, spoke of how Acorn is responding to the current climate.

'Before we had to deal with thirty to forty LEAs,' he said. 'Now, as a result of government changes, we have to deal with thousands of individual schools. Rather than reach the hearts and minds of a few key people, we have to convince individual head teachers and teachers within each school.'

One of the ways that Acorn hope to achieve this is by setting up a new initiative called Acorn Education Centres (AECs). These are to be based within existing independent IT centres, but will be authorised by Acorn to provide certain services.

THE NEW CENTRES

By setting up AECs, Acorn aim to provide the centres wth a constant flow of information and support. Schools will be able to use the centres to try out Acorn-based software and hardware. The AECs will also be able to provide an advisory service within the centre or via a telephone helpline.

But in addition to the strong links with Acorn, many IT centres see the scheme as a way to cushion their trip into independence.

'Increasingly, existing IT centres will need to be self-financing,' said Peter. 'Some have already had the umbilical cord to the LEA cut and the White Paper will speed up this process.

'There was a sense of isolation at being cut off from the LEAs. The key thing for many IT centres is to be part of a community and our AEC scheme offers them the chance to join a network of like-minded collegues.'

The AECs will not be directly funded by Acorn, and so the partnership will be one of good will and co-operation rather than a formalised contract. As more centres become self-financing they will need to charge for services, but the way that AECs operate is down to each particular centre. 'Payment may be a fee for services, or it might be a subscription, depending on which

EDUCATION DEALERS

The newly accredited education dealers are expected to offer a range of services that Acorn hope will portray the machines in a positive and helpful light. Terry Sherwood is General Manager at Acorn and is central to the recent dealership changes.

'The needs of educational customers are changing changing rapidly', Terry told us. 'As a result Acorn has imposed a set of criteria and a dealer must conform to these if they are to achieve accreditation from Acorn. We want to ensure that the paying customer not only receives an excellent product but gets excellent service as well.'

So what are these new criteria and how will they effect the Acorn customer? Among the things that Terry listed as intrinsic to the education dealer were a full selection of products.

'A range of third party products including peripherals and software: this will ensure that the end-user has access to all those other good things that can surround an Acorn computer.'

He has also laid down new guidelines for the staff: 'A dealer's staff will have skills in networking to provide advice and consultancy. They will also be able to give customer training and support as an authorised network dealer.'

And aftersales support is a key factor. 'Each education dealer must provide telephone support, after-sales service, including the stocking of spare parts along with the ability to repair.'

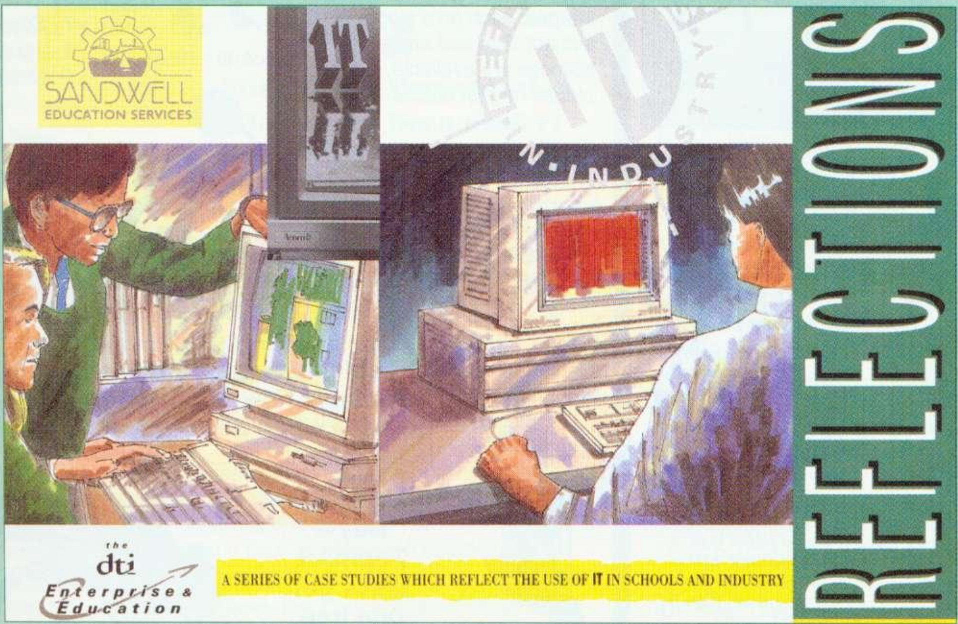
Another point that will appeal to education is that the dealers will be expected to fly the Acorn flag by organising events and exhibitions.

'Acorn believes that the changes it is making to distribution will ensure that an Acorn customer is well looked after before, during and after the sale. Acorn dealers should reflect the excellence of the product.'



The new Watford Electronics building in Luton – shiny and impressive on the outside, but before it could qualify as an education dealer it also needed to have a wide selection of software, trained staff, networking abilities and an organised programme of local Acorn events

NEW AEC CENTRES



The lynch pin of Acorn's new educational plans are the AECs, or Acorn Education Centres. The AECs are based within existing IT centres who have greeted the plans enthusiatically.

When the AECs were officially announced on August 27, twenty IT centres were accepted onto the scheme. Mike Smith, who runs an existing IT centre at Sandwell was at the launch and and gave us his reaction to the scheme.

'After more than ten years in IT support, I am keen to see this initiative succeed. In many areas, teachers have become used to good quality support and the AEC scheme will help set a minimum standard. This will include the provision of drop-in and telephone help, training facilities, display area and access to demonstration equipment.

Of course, many centres already aspire to this – and indeed offer much more. But I see two particular benefits from the new arrangement. First, it defines a group of centres into which Acorn can concentrate their support. This will also, hopefully, apply to software houses and third-party hardware suppliers. All of this means that schools should get a better quality service.

Another benefit of the scheme is less obvious but, in the longer term, likely to be just as significant. Until now, IT support has been free. Those days are coming to an end. Services are delegated to schools and so are the bills. The cost has always been there, of course, but in the past schools did not need to think too much about them. By subscribing to an AEC they will get a assured level of service and will also be able to perceive the value of that service.

IT support is labour-intensive. The cost of employing an advisory teacher plus overheads is, at a minimum, £30,000 pa and usually more. Sensibly they cannot spend more than three days out of five working in school which means that £200 per day is the minimum cost of advisory teacher support. Similar calculations can be produced to illustrate the cost of providing other aspects of IT support; none of it comes cheap. So will schools pay? I think they will, provided they know that they are receiving good value for money. Local centres make sure that they provide that quality, but they also need to ease schools into thinking about the value and cost of a quality service.

The Government has made it clear that it wants local services taken out of the hands of the LEAs. Where opting-out passes the 75 percent threshold set by the White Paper, this is unavoidable. Even where an LEA, through delegation, retains control of its schools, local services will increasingly be provided at arm's length.

Local IT centres have welcomed the announcement of the Acorn in Education Centres initiative as a well-timed and necessary development. As LMS bites, (the Local Management of Schools) and the position of LEAs is threatened by the White Paper proposals, many centre leaders see the AEC as a means of helping to secure the long-term future of local IT support.

This is not to imply that Acorn is putting money into centres. It isn't. However, the company will be actively promoting the centres, and intends to provide them with the level of information and advice that will allow them to offer a quality service to schools.

Survival in this environment is more than self-interest. IT in schools has been a major success story. A crucial factor in this success has been the availability of expert and friendly advice, support and training at a local level where needs are best understood. It's in everyone's interest, not least the pupils, to see that this continues.'

Mike Smith is head of the Educational and Microtechnology unit at Sandwell. The unit already offers a range of services to the education community and to highlight some of the IT work in their local area, the centre have produced the leaflet shown above. You can purchase a copy by writing to The Educational and Microtechnology Unit, Sandwell Educational Development Centre, Popes Lane, Oldbury, West Midlands, B69 4PJ. Tel: (021) 544 2001.

The centre was recently approved as an AEC and will be offering telephone support, training and an advisory service.They also specialise in networking solutions, techinical support and repairs.

way the centre wishes to operate,' said Peter Talbot.

The kind of services an AEC provides will also vary from centre to centre.

'Take networking. Schools need an educational understanding of networks before they get the practical implementation: how it fits into the curriculum, how it would benefit a particular school and so on. This is what the AEC can provide.

'Some AECs will also have the expertise to install the system. Others may prefer to leave that to the dealers.'

And this is where the second part of the campaign comes in.

EDUCATION DEALERS

Acorn plan to have a new tier of dealers known as education dealers. They will be chosen from exisiting dealerships and need to adhere to a detailed set of guidelines.

When schools attend an AEC for advice, they will often be referred to one of the education dealers to obtain the suitable product. And by having approved education dealers, Acorn also hope to combat the issue of resourcing.

'Eighty percent of our business is achieved by 20 percent of our dealers,' Acorn told us. 'So it makes sense to target our energies into those dealers. The education dealers will be closer to us and will benefit from our resources.'

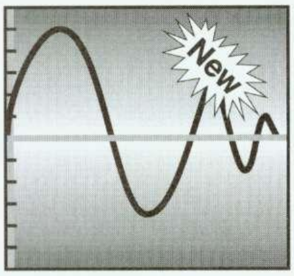
To find out where your local AEC or education dealer is situated, contact Acorn computers, (0223) 245200.



Peter Talbot: 'Rather than reach the hearts and minds of a few key people, we have to convince individual head teachers and teachers within each school'

Your RISCOS Compliant Acorn Dealer!

QuickSound £10+VAT



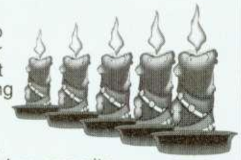
QuickSound allows you to load, play, convert & resave existing sound samples. Armadeus, Tracker, raw data and Sound Synth samples are supported. Samples can also be converted into modules for use with the RISCOS sound system, Maestro, Rhapsody etc or alternatively converted into stand alone Utility sample modules which when called, via a star command, loads the utility, plays the sample and then removes itself completely from memory (this feature is not available on any other sound package). Special effects which can be applied to samples include Reverse, Echo, Max Vol, alter replay rate and resample at other frequencies. On screen VU meter is also featured. QuickSound is a perfect compliment to the Oak Sound Recorder.

MegaUtils £10+VAT



A set of genuinely useful RISCOS utilities !AddrBook An easy to use address book.
!Diary A place to store your birthdays etc.
!CleanUp A hot key util for redrawing windows.
!Disable Prevents you from deleting any file.
!DOSForm A multi-tasking DOS 720k formatter.
!FileMon Displays information about any file.
!LineClock A desktop clock.
!MegaUtils provides a window organiser, key short-cuts to open/close filer windows, set copy and wipe options, set filetypes, quick loading of basic programs, caret flasher, selection of mouse speed, automatic opening of applications, mouse hider, caret grabbing.
!QuickMode Select modes with ease.
!QuickRun An application loader.
!ScrGrab Saves the screen display to a Sprite.

Tiler £10+VAT



A printing utility which allows you to print Draw or Sprite files at any size using any printer. The user simply loads the required draw or sprite file into Tiler specifying the size of poster required, using a preset paper size, ie. A2, A0 etc, or as a percentage of the original size or in physical dimensions, ie millimetres. The document will then be increased or decreased in size automatically and printed over several pages with crop marks provided on each page to assist cutting/overlapping.

TopicArt

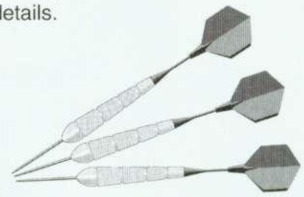
A new form of clip art comprising of single discs containing approximately 50 hand drawn high quality draw format clip art images, each on a single subject. Site and area licences are available, please ring for details.



TopicArt9 - Dinosaurs

Subjects available
1 - General
2 - Transport
3 - Costumes
4 - Entertainment
5 - Bugs 2 Slugs
6 - Road Signs
7 - Sports Equip
8 - Sports Figures
9 - Dinosaurs

£8 +VAT per disc.



TopicArt7 - Sports Equipment



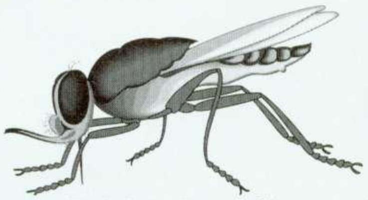
TopicArt4 Entertainment

9 TopicArt subjects are available now. Please specify when ordering.



TopicArt8 Sports Figures

Buy 4 TopicArt discs get one free



TopicArt5 - Bugs to Slugs

Hardware & Books (All prices exclude VAT)

New Pocket Book

Acorn Pocket Book £212

New A3010 Series

Family Solution £424
No monitor required, connects to standard TV. 1Mb RAM, Floppy drive, 2 joystick ports, fast processor, soft/w

Learning Curve Sys £680
As above with 2Mb RAM, Standard Monitor & Learning Curve software.

New A3020 Series

Floppy Disc System £749
As A3010 less Learning Curve software & joystick ports. Includes Standard Monitor, 2Mb RAM & can be upgraded to Econet/Ethernet.

60Mb Hard Disc Sys £899
As above with 60Mb Hard disc.

Add £50 to above A3020 system prices for MultiScan Monitor.

New A4000 Series

Home Office System £999
3 Box design with 2Mb RAM, Floppy Drive, 80Mb hard disc, Standard Monitor, EasiWriter2, Junior Database

80Mb Hard Disc Sys £949
As above without additional software

Add £50 to above A4000 system prices for MultiScan Monitor.

New A5000 Series

Learning Curve Sys £1445
2Mb RAM, 80Mb HD, MultiScan Mon, Learning Curve Software.

80Mb Hard Disc Sys £1399
As above without Learning Curve

120Mb Hard Disc Sys £1599
As above with 4Mb RAM & 120Mb HD

Add £212 to above prices for Acorn JP-150 Ink Jet Printer

New A4 Portable

A4 2MFD Portable £1399
2Mb RAM, 2Mb Floppy, LCD Screen

A4 4MHD Portable £1699
4Mb RAM, 60Mb HD, 2Mb Floppy Disc, LCD Screen, PC Emulator.

RAM Upgrades

A3000 2Mb RAM	£45
A3000 4Mb RAM	£129
A5000 2Mb RAM	£85
A400 1Mb RAM	£35
A400 2Mb RAM	£65
A400 3Mb RAM	£100
A540 4Mb RAM	£245

Printers

Canon BJ-10ex	£190
Canon BJ-10 Turbo	£225
Canon BJ-10 ASF	£49
Canon BJ-20 (Inc ASF)	£289
Canon BJ-300	£329
Canon BJ-300 ASF	£99
Canon BJ-330	£399
Canon BJC-800 Turbo	£1895
Citizen Swift 24e	£235
Citizen Swift 24 ASF	£75
HP DeskJet 500	£329
HP DeskJet 500C	£479
Panasonic KXP-1123	£159
Star LC-200	£175
Star LC24-200 Colour	£239
LaserDirect HiRes4	£949
LaserDirect HiRes8	£1319
LD HiRes4 Card	£349

Includes cable & driver

Upgrades

5.25" Disc Buffer	£39
ARM3	£185
A3000 Dual Pod Exp	£55
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Canon BJC Turbo Driver	£99
DeltaCat Joystick	£29
FaxPack (CC)	£279
Hawk V9 Video Dig	£199
I/O Expansion Card	£79
Joystick I/F (All M/C's)	£32
Joystick for above	£10
Midi Expansion Card	£65
Micro Mouse (Clares)	£29
PC Card 1Mb (Aleph1)	£449
PRES Monitor Stand	£29
Serial Upgrade A3000	£17
User/Midi Card A3000	£46
VIDC Enhancer	£27
Vision Mono Digitiser int	£49
Vision Mono Digitiser ext	£62
For Colour Digitiser add	£30

Monitors

Acorn Standard Colour	£199
Acorn MultiScan	£299
EIZO 9060S FlexScan	£429
Philips CM8833 II	£189
Taxan 795A	£439

Scanners

ScanLight 256	£199
ScanLight A4	£289
ScanLight A4+Feeder	£389
ScanLight Professional	£595
SCSI Card for above	£139

RISCOS 3 £49 Inc

Orders being taken now!

Acorn Books

A3000 Technical Guide	£29.95
A540 Technical Guide	£65.00
A5000 Technical Guide	£65.00
BBC Basic Guide	£19.95
RISCOS2 PRM's	£79.00
RISCOS3 PRM's	TBA
RISCOS2 Style Guide	£9.95
1st Word+ Manual	£10.00
Desktop Dev Env Guide	£25.00
DTP Manual	£10.00
Assembler Manual	£25.00
ANSI C v4 Manual	£25.00

Other Books

Archi Game Maker's Manual	£14.95
DTP on the Archimedes	£12.95
Archi Assembly Lang Manual	£14.95
Archimedes First Steps	£9.95
Archi Operating System Guide	£14.95
Budget DTP	£12.95
Mastering 1st Word+	£13.95
First Impressions	£35.00
Good Impressions	£30.00

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BJ-10/20 Ink Cartridge	£16
BJ-300 Ink Cartridge	£11
DJ-500 Bk Hi-Cap Cart.	£21
DJ-500C Colour Cart.	£22
Swift24 Mono/Colour	£5/£15

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Please specify the goods you require and for which computer. Please have your credit/debit card ready. We will require the cardholders name, address, delivery address if different and the expiry date of the card.

Ordering by Post

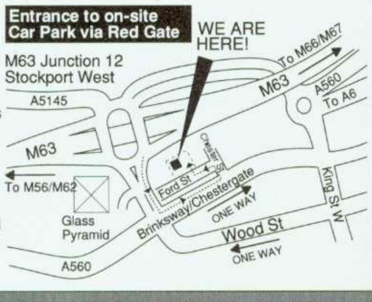
Please specify the goods you require and for which computer in writing including your telephone number & delivery address. Send complete with a signed cheque/postal order or alternatively for credit/debit cards, the card number, cardholders name, address, and expiry date. IMPORTANT - Please write your name, address & credit card details in BLOCK CAPITALS to avoid confusion.

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Opening Hours Monday-Saturday 10.00 to 18.00

QuickShow £25+VAT

!QuickShow
Video Titling
&
Slide Show Presentation
Has never been easier!

QuickShow is an easy to use slide show presentation and video titling package. It allows you to create a sequence of frames containing text of any colour with drop shadows, outline shadows and rubout boxes using outline fonts. Sprites can also be included in frames and positioned and rezised as necessary. Once several screens have been created they can be linked together with the sequencer which allows you to fade each screen out and in with the many fades provided with the package. Completed sequences can be converted to a stand alone application which when run, automatically 'Shows' the sequence without using !QuickShow.

Flopticals / CD-ROM / Tape Streamers

A3000/A5000/A300/A400 External Floptical (without SCSI card) **£399**

A5000 Internal Floptical kit (with Econet SCSI card) **£359**

Floptical floppies (20Mb) **£20**
Each of the above systems comes complete with one floptical floppy.

Cumana CD-ROM Combi Pack **£699**
Comprises CD-ROM drive, SCSI card, stereo speakers, 6 RISCOS CD-ROM titles, The Hutchinson Encyclopedia, Dictionary of the Living World, Revelation 2, The Illustrated Holy Bible, The Illustrated Works of Shakespeare, Sherlock Holmes on a Disc, !CDPlayer, 3 caddies, etc.

150Mb Tape Streamer (without SCSI card) **£399**
Our Tape Streamers are housed in attractive case with power supply and fan and are suitable for any Acorn RISCOS computer (however they must be used with an Acorn compliant SCSI card). They come complete with one data cartridge and Morley's SAS (Safe and Sound) tape backup software.

Hard Discs

IDE

The following are complete HardDisc Systems comprising of IDE disc controller, HardDisc, mounting brackets, cables, utilities disc and manual.

Archimedes Internal	
40Mb 17ms	£210
105Mb 17ms Cache	£305
125Mb 16ms Cache	£359
200Mb 13ms Cache	£499
330Mb 12ms Cache	£749
520Mb 12ms Cache	£999
A5000 Exchange Drives	
120Mb 16ms Cache	£200
200Mb 13ms Cache	£350
A3000/Archi External	
40Mb 17ms	£299
105Mb 17ms Cache	£399
125Mb 16ms Cache	£455
200Mb 13ms Cache	£599
330Mb 12ms Cache	£849
520Mb 12ms Cache	£1089
A3000 Hard Cards	
30Mb Internal	£249
45Mb External	£399
100Mb External	£499
IDE Hard Disc Interface	
IDE Controller	£69

Please ring for further details.

SCSI

The following are complete SCSI HardDisc Systems comprising of a Morley SCSI interface, HardDisc, mounting brackets, cables, utilities disc and manual.

Archimedes Internal	
105Mb 18ms Cache	£429
180Mb 18ms Cache	£599
330Mb 12ms Cache	£899
520Mb 12ms Cache	£1049
A3000/A300/A400 External	
105Mb 18ms Cache	£509
180Mb 18ms Cache	£699
330Mb 12ms Cache	£979
520Mb 12ms Cache	£1149
Removable Hard Discs	
44Mb (Inc one cartridge)	£499
44Mb Cartridge	£55
88Mb (Inc one cartridge)	£599
88Mb Cartridge	£99
The above are external units	
SCSI Controller Cards	
Morley Uncached	£139
Morley Cached	£189

Archimedes, A3000, A5000 Software

Applications

3D Construction Kit (Domark)	£38
ABC Compiler (Oak)	£77
Alphabase (Clares)	£37
Ancestry (Minerva)	£59
ANSI C v.3 (Acorn)	£125
Arc DFS (Dabs)	£22
ArcComm2 (Logotron)	£52
ArcLight (Ace)	£40
ArcTerm 7 (Serial Port)	£62
Arcticulate (4D)	£20
Arctist (4D)	£20
Armadeus (Clares)	£59
Artisan 2 (Clares)	£43
Art Works (CC)	**£149**
Atelier (Minerva)	£69
Autosketch v2 (Autodesk)	£65
Cable News (Lingenuity)	£165
CADet (Minerva)	£139
Chameleon 2 (4Mation)	£35
Compression (CC)	£39
Control Panel (Lingenuity)	£14
DataVision (Silicon)	£110
Desktop Assembler (Acorn)	£125
Desktop C (Acorn)	£185
Desktop Office (Minerva)	£95
Desktop Publisher (Acorn)	£125
Desktop Thesaurus (RISC Dev)	**£19**
Draw Print-Plot (Oak)	£39
Easiword (Minerva)	£29
Easy Writer II (Icon Tech)	£126
Einstein (Ace)	£106
Equasor (CC)	£39
Euclid 2 (Ace)	£50
Eureka (Longman)	**£109**
Film-Maker (Silicon)	£71
Financial Accountant (Silicon)	£203
First Word Plus v2 (Acorn)	£67
Font FX (DataStore)	£9
Font Starter Pack (Acorn)	£35
Gammaplot (Minerva)	£36
Genesis 2 (Oak Solutions)	£109
Graphbox v2 (Minerva)	£57
Graphbox Pro (Minerva)	£109
Hard Disc Companion II(Beebug)	£45
Hearsay II (Beebug)	£70
Hotlink Presenter (Lingenuity)	£41
Home Accounts (Minerva)	£34
Illusionist (Clares)	£76
Impression v2 (CC)	**£125**
Impression Junior (CC)	£75
Impression Bus Supp (CC)	£39
Inter-Chart (CC)	£20
Inter-Sheet II (CC)	£30
Inter-Word (CC)	£30
Investigator v2 (Serial Port)	£22
ISO Pascal Rel.2 (Acorn)	£83
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MasterFile II (Beebug)	£20
MegaUtils (Desktop Projects)	**£10**
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Snippet (4Mation)	£26
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Speech! (Superior)	£15
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Squirrel Database (Dig Serv)	**£125**
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Super-Plot (Silicon)	£28
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ARTWORKS BRINGS OUT THE ARTIST IN YOU

Art Works

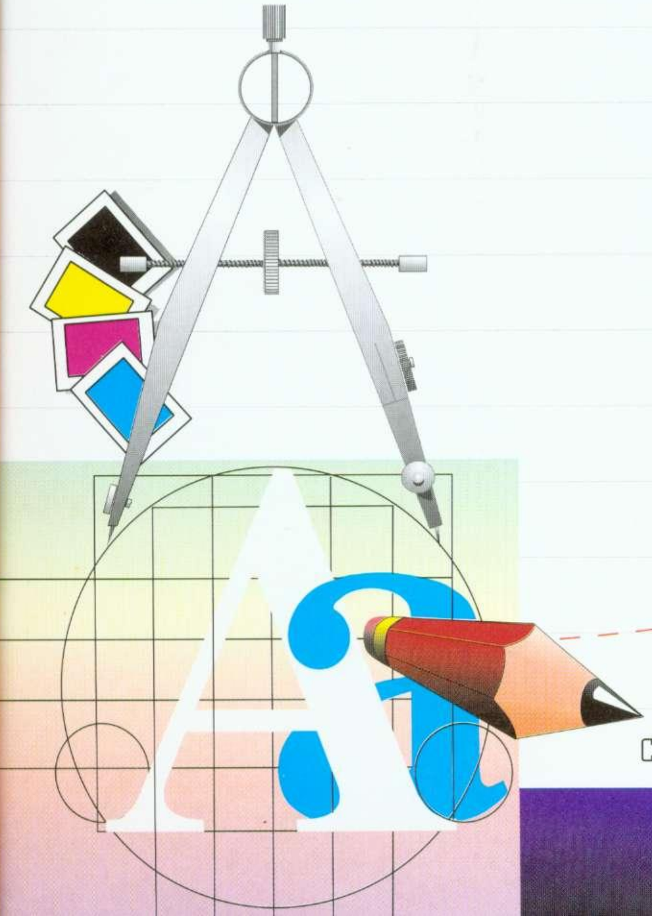
THE

GRAPHICS ILLUSTRATION PROGRAM

FOR THE

ARCHIMEDES





Computer Concepts Ltd

ArtWorks is an entirely new program designed specifically for the Archimedes range, that takes this computer into the competitive world of graphic design. An object orientated graphic illustration program, ArtWorks is intended to compete with the leading products on other machines - CorelDraw, Adobe Illustrator and Aldus Freehand.



The RISC technology of the Archimedes is ideally suited to applications where good graphics, and screen update speed are important. Comparisons indicate that on a A540, A5000 computer (or any machine with an ARM3), ArtWorks can redraw complex illustrations five or more times faster than either a Mac IIci or the fastest 486 based PC.

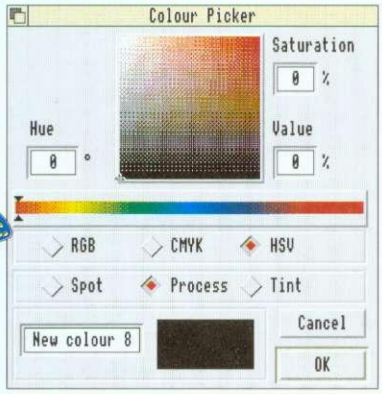
Speed and productivity

Speed of screen redraw and ease of use are paramount when it comes to making illustration programs productive, and a great deal of design effort has gone into this area. Based on feedback we have had from users working with prototype versions, we have succeeded in making the program faster and easier to use than other leading illustration programs. This means that is not only more fun to use, but it's also more productive, which means more time and money saved.



24-bit colour

ArtWorks uses a 24-bit colour representation throughout for all objects and offers three colour models for setting or selecting colours (RGB, HSV or CMYK) and three types of colour - full 24 bit process colour, spot colour and colour tints.



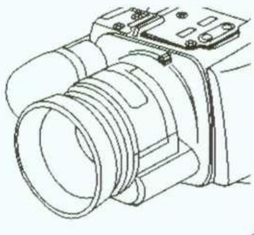
▲ ***Illustration shows the HSV colour selector dialogue box***

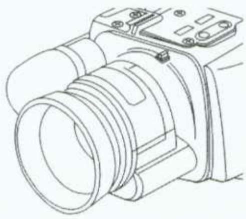
Comprehensive colour separation facilities are included with full support for spot colour and full, four colour, process separations. Under-colour removal and colour overprint control provide the professionals with the control needed to ensure the best possible reproduction.

ArtWorks uses advanced dithering to give the best possible on-screen representation when being used in 16 and 256 colour screen modes. Using a special palette in conjunction with the dithering even allows full spectrum colour work in 16 colour screen modes. The colour dithering works under RISC OS 2 and 3 and is more accurate than that available under the new RISC OS 3 operating system.

Anti-aliasing

To our knowledge ArtWorks is the only object orientated drawing program on any machine to offer real-time on screen anti-aliasing. This technique is used by Acorn's outline font system to enhance the screen image and remove screen 'jaggies'. This results in an apparent increase in screen resolution to more than double the actual screen resolution, and surprisingly this even works to good effect in 16 colour screen modes.





The advantages of anti-aliased fonts are well known to Archimedes owners, providing a more accurate and realistic display of the font. The same advantages apply to the anti-aliased drawings displayed in ArtWorks.

WYSIWYG

ArtWorks offers a completely variable choice between screen display accuracy and screen update speed. But rather than offering just two settings between 'outlines only' and best full colour screen rendering, ArtWorks offers a variable control. At the maximum setting it displays a full colour, fully shaded, anti-aliased display. Set the control down a little and the anti-aliasing is turned off, set it lower still and the colour shading is reduced, all the way down to a minimum setting where it displays outlines only.



▲ ***Illustration shows info bar with the WYSIWYG knob on the right indicating a setting of 11***

ArtWorks allows full editing of the illustration at any WYSIWYG setting, so you can choose between working on your drawing in full colour or just outlines, or anything in between.

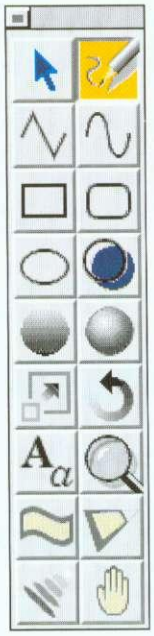
Modular program

The ArtWorks program is made from a collection of individual modules and tools that integrate to form the complete package. This modular approach means the program is easily extendible, and customisable. For instance, new modules could be added in the future that bring enhanced or new features - it is not necessary to replace the whole program, and it is hoped that add-on modules will appear from both Computer Concepts and other software houses. For example, although ArtWorks is not a painting or photo-retouching program this functionality could be combined with all the existing ArtWorks features by purchasing an ArtWorks painting module.

On the other hand, if there are certain areas of ArtWorks that you find you do not need, these can be removed from the program, saving memory and disc space.

Info and tool bars

ArtWorks introduces the concept of two floating tool and information palettes. The main toolbar holds icons for each of the key drawing tools.



▲ ***Illustration shows the expanded toolbar with the freehand tool selected***

Each tool has an appropriate information bar that is usually displayed along the lower edge of the drawing.

Shows the info bar for the scale tool. Like most tools, the scale tool provides a comprehensive set of facilities accessible directly from the toolbar without having to use menus. On the example shown, the 3 by 3 arrangement of buttons controls the point around which the object is scaled. Using the mouse you can move the scale origin to any position, but the 9 preset buttons enable you to set the scale origin to any edge, corner, or the centre. The X and Y buttons flip the object about the X or Y axis.The Width button determines if line widths are to be scaled in proportion and the Lock button locks the aspect ratio of the scale. ▼



The info bar displays information about the current tool settings and usually allows exact numeric values to be entered where appropriate. Most tools interact and can be controlled directly with the mouse, so you can perform the appropriate action directly on the drawing. As you do this the info bar continually updates its display providing exact numeric feedback as you drag.

ArtWorks therefore provides the best of both worlds - freeform, by eye, operations or precise numerically exact operations, making ArtWorks ideal for both technical drawing work, or purely illustrative artistic work.

Both the info bar and the toolbar can be positioned where required. The toolbar can be further customised by re-arranging the tool icons and allowing icons to be grouped to reduce the size and complexity of the bar.

Interactive tools

This feature makes a significant contribution to the productivity of ArtWorks. You can see the effect of the tool as you actually perform the act of dragging with the mouse. So, when moving objects around, you don't just see a meaningless square bounding box - you see the outline of the actual shape being dragged on screen. The same applies when you rotate or scale objects. The result is that there is no trial and error involved when performing these operations - the direct visual feedback allows you to position things on screen, absolutely accurately, first time.

Review

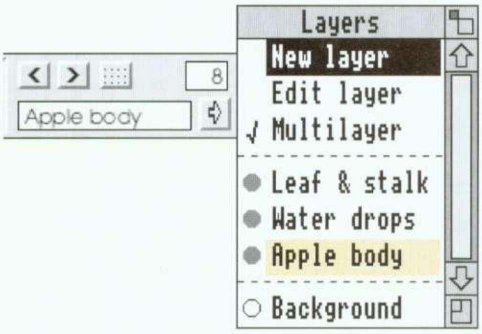
"*...it forms what is perhaps the easiest to use, but most advanced graphic illustration package on any personal computer today*"

ACORN USER
April 1992

Layers

Vital for complex technical illustrations, but also useful for illustrative artwork is the ability to break complex drawings into any number of separate layers.

Each layer can be given any name and set to be displayed or not. The info bar always shows the current layer, and a pop-up menu controls all the layering features. The ordering of the layers can be altered.



▲ ***The info bar shows the layer called "Apple body" is the current layer. This drawing has four layers in total, the background layer is switched off and the multi-layer mode is switched on so that all visible layers can be edited at the same time.***

The layering facility makes it easy to work on certain aspects of the drawing without interfering with other parts. If, for example, a drawing is based on a scanned image, this image can be kept in a separate layer so that it takes no part in the editing process - so clicks over the image do not move the image, and a single menu click can turn the image layer off so it can't be seen. Another typical use of layers is in annotations of technical illustrations - the wording can be kept quite separate from the illustration itself.

Undo

One of the key differences between a drawing program, such as ArtWorks, and a painting program is that all operations in painting programs are permanent - just as with real paint. Once you've made an alteration to the painting, that's it. The only way you can change it or undo the change is to re-paint over the original again - just like real paint. As a consequence you need to have a high degree of confidence and artistic skill to be sure that the changes you make are going to be right.

With drawing programs each line or part of the drawing is a separate feature that can be changed, moved, or altered in any way at any time. This all boils down to one great advantage - experimentation. You can afford to try an idea on the drawing in the certain knowledge that if it doesn't look right you can remove the feature or undo the operation to restore the drawing.

Review

"Working with full colour images in Corel is painful - it took seven times longer to create the same image that was used on the Archimedes, and that's a long time if you're constantly editing and changing your work"

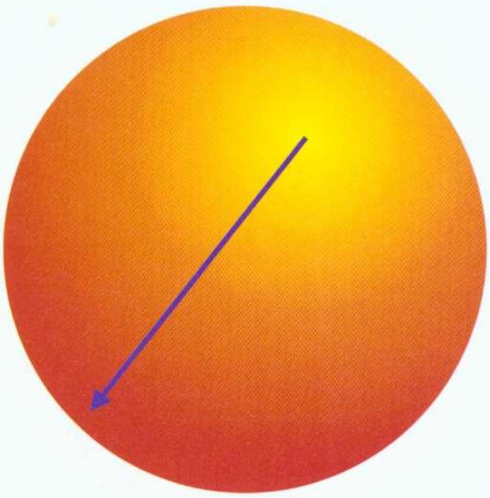
COMPUTER SHOPPER
August 1992

ArtWorks goes further than any other drawing program by recording not just the last step or operation, but as many previous steps as you require. You can make any series of alterations without worrying if it's going to be right in the end. If it's not, then just use the undo feature to retrace the steps back to any point in the drawing.

Also ArtWorks can store this record of steps, known as the undo record, with the drawing on file. So you can load a drawing and still decide that you didn't like the last changes you made and undo them.

We cannot claim you can produce artistic masterpieces first time, but ArtWorks does bring out the artist in you.

Graduated shading



One of the main aspects that distinguishes good looking illustrations from simple line drawings is high quality shading. ArtWorks has the simplest and fastest colour shading system of any drawing program.

If you want to fill a shape with a graduated colour shade using the colour shading tools, you simply click where you want the colour to start, drag in the direction you want the shade to be graduated, and let go. The object is instantly filled with a graduated shade going from one colour to another.



▲ ***The Radial fill info bar shows the start and end colour of the shaded fill. Selecting an alternative colour from the current colour lists or creating an entirely new colour for either the start or end is instantly reflected in the drawing.***

Unlike many drawing programs where graduated shading can only be simulated by overlaying dozens of slightly different coloured objects, ArtWorks graduated shades are stored in memory as one single object. The graduated colour fill is performed in a single rendering operation - ArtWorks can draw a graduated filled object faster than !Draw can fill a simple single colour object. It also uses the colour dithering system so that even in 16 colour screen modes you get a full spectrum of colours with colours smoothly and evenly changing from one colour into another.

Graduated shading is simple, very fast, and requires very little memory.

Review

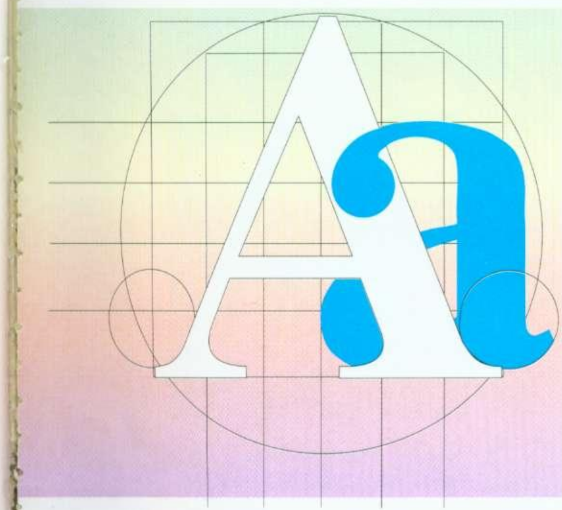
"ArtWorks is set to make a very considerable impact on Archimedes users"

COMPUTER SHOPPER
May 1992

◀ ***With the radial fill tool one simple click and drag turns a hollow circle into a shaded ball, and straight linear graduated fills are just as easy.***

Text

The ArtWorks text tool provides the ability to enter lines of text directly on the screen. A text objects behaves like all other objects in ArtWorks, so you can rotate it, give the characters a different outline colour, and draw a graduated shade across the text. But the unique aspect of ArtWorks is that the text remains editable text even after you have applied such effects. If you want to edit the actual character outlines, then a single menu option will change the text into editable curves and lines making it easy to customise the actual character shapes.



On top of this there is manual kerning, the ability to wrap text along a curve, and all these text handling features work on RISC OS2 as well as version 3.

Lines and curves

While ArtWorks drawing facilities are based on those of PostScript - it uses bezier lines and polygons - it tries not to get bound up in the normal PostScript jargon. You don't have to know what open bezier paths are, or what winding rule is used when filling. Basically ArtWorks supports two simple drawing primitives - lines and shapes. Shapes are solid filled objects and lines are, well, lines.

ArtWorks automatically fills any shape that is drawn to become a closed object.



▲ ***Draw one side of a heart shape with the freehand tool.***

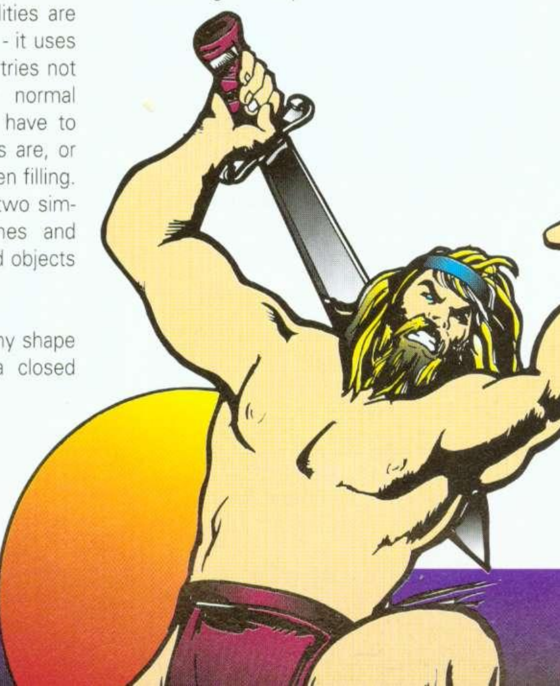


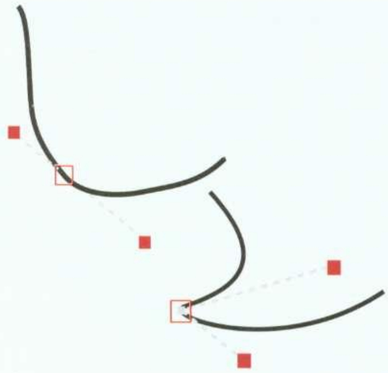
▲ ***Draw the second half so it becomes a complete shape and ArtWorks will fill it in the current colour. Of course you don't have to fill it with any colour - it can be transparent.***

Review

> *"Many effects that would take a long time in Draw can be achieved in seconds with ArtWorks"*
>
> **ACORN USER**
> *April 1992*

The line and curve editing facilities are simple to use and extensive. You can select more than one point on a curve and delete or move them all at once. Lines can be converted to curves and vice versa. You can add new segments into curves simply by clicking on the curve, and you can change a curve from being a smooth curve into a corner 'cusp' point just by double clicking on the point.

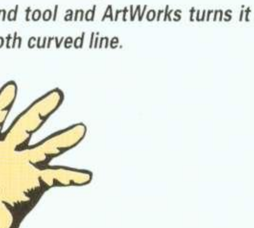




▲ ***Simply double click on the control point and what was a smooth curve can be turned into a cusp or corner point.***

Freehand drawing tool

One of the criticisms of previous drawing tools is that they do not offer the immediacy or natural feel of real pens or pencils and paper. The fact that all lines have to be made from precise mathematical curves has meant that it was difficult and time consuming to draw lines with a natural freehand look. To overcome this ArtWorks has a special tool called the freehand drawing tool. With this you simply click and then draw with the mouse. When you stop, ArtWorks analyses all the mouse movements and calculates the best fit smooth curve to follow the original line.



▲ ***Draw a not very smooth line with the freehand tool and ArtWorks turns it into a smooth curved line.***

The freehand tool has an accuracy control that determines how close the smoothed line follows the original.

Compatibility

In order to compete with products on the world stage, ArtWorks has been made to import and export files to and from the leading illustration packages on other systems. It can read and write files for CorelDraw 2 and 3 on the PC and from Illustrator and Freehand on the Mac.

Review

"Impression must be widely acknowledged as one of the most important pieces of software on the Archimedes. ArtWorks is going to be just as important"

COMPUTER SHOPPER
MAY 1992

Under RISC OS 3 (or using an alternative PC disc reader) it couldn't be simpler. For example, you can be editing a CorelDraw file on your PC, save this to floppy, then load the file directly from this floppy into ArtWorks. Or vice versa, save an ArtWorks file directly to a PC floppy to be loaded straight into CorelDraw. Since Macs can now read PC discs it's not much more difficult transferring to or from that computer.

In order to guarantee compatibility with other Acorn applications, it can of course also read and write Acorn Draw files and will, if necessary, convert graduated fills and blends to multi-shaded polygons and export distorted text as outlines.

In addition to this some applications, such as Impression and Impression Junior, can display ArtWorks files directly, thereby benefiting from the superior speed and quality possible from the ArtWorks display system.

220 outline fonts

ArtWorks is compatible with all RISC OS outline fonts now available for the machine, but, in addition the package includes an incredible 220 high quality outline fonts - 200 of which are new to the Archimedes! These provide a huge range of styles and designs and because they are just normal Acorn outlines fonts they can be used by any other program such as Impression. (Typically the cost of obtaining this number of fonts would be more than the entire ArtWorks package.)

Dynamic blends

One of the most powerful tools in ArtWorks is the blend or 'in-betweening' tool. Starting with two different shapes this tool can create a series of intermediate shapes that gradually change from the start shape into the end one.

ArtWorks blends offer three important features not found in other programs. Firstly the blends can be between shapes that have differing numbers of curves and lines - in other words you can change from one shape into a completely different shape.

Review

"ArtWorks is turning out to be something special"

COMPUTER SHOPPER
August 1992

Secondly, the blends are dynamic - all the intermediate steps are calculated and drawn on the fly, so that changing either the start or end shape will automatically re-create all the intermediate steps. Perhaps more importantly, the intermediate steps are not stored in memory so ArtWorks blend objects occupy a tiny fraction of the memory required by all other drawing programs. Indeed, a



complex blend that is made from 100 intermediate steps would need only 1% of the memory required by other drawing programs.

Lastly; blends are not restricted to just two shapes. You can blend from one shape to another, to another, etc.

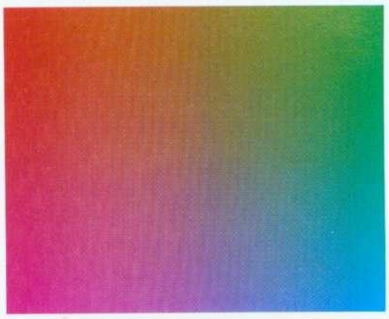
Since blends not only change the shape, but also other characteristics such as line thickness and colour, they can be used for very sophisticated colour shading effects.

In fact a blend can even blend from one object containing a graduated shade into another object containing another different graduated shade.





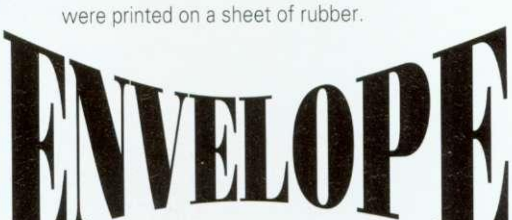
▲ *This shows two rectangles, each with a graduated shade going across the rectangle.*



▲ *By blending from one rectangle to another ArtWorks can create a series of intermediate rectangles, each with their own graduated fill. This simple example takes a few seconds to create and requires only a few hundred bytes of memory. In any other drawing program it could take many hours and would almost certainly require dozens of kilobytes of memory.*

Envelope

This tool provides a simple way to bend or distort objects, or any part of a drawing, in a simple and intuitive manner. In fact the objects can be distorted in a similar way as if they were printed on a sheet of rubber.



The enveloping tool is so fast it is almost instantaneous at distorting all but the most complex objects.

Perspective

Although the envelope tool can create perspective like effects by squashing parts of the shape, ArtWorks provides a tool that performs a true three dimensional transformation of any part of your drawing.

The perspective tool allows objects to be rotated into the distance and calculates and displays a true 3D projection. It can even show two vanishing points on screen which can be dragged around for the quickest and easiest way to manipulate objects in space.

Usability

There are dozens of other minor and not so minor features that help make ArtWorks a more usable and friendly graphics tool. For example, in ArtWorks you select objects by clicking directly on the object, rather than somewhere inside its rectangular and invisible bounding box. As a consequence, when you have a complicated drawing with dozens of overlapping objects you can select what you want directly, instantly, with no possibility of selecting the wrong item. Once you've experienced this feature it makes you wonder how you ever managed without it.



Printing

ArtWorks supports all RISC OS printer drivers, including the new Computer Concepts 24-bit colour drivers. It also fully supports PostScript printers providing control over screen angles and density. It can print to a Postscript file suitable for external imagesetting. ArtWorks can produce 4-colour (and any number of spot colour) separations on all printers (and can show separations on screen also).

Print tiling allows large prints to be made covering many sheets of paper. This works on all printers and each page is produced with co-ordinates for the tile position and precise trim marks. So now you can produce your own wall sized posters from a normal A4 printer.

Review

> ***"ArtWorks is quite simply the best vector drawing software on the Archimedes"***
>
> COMPUTER SHOPPER
> May 1992

Another invaluable feature is background redrawing. Even though ArtWorks can display drawings several times faster than other products, complex illustrations can take quite a few seconds to draw on screen. Normally this not only slows down the editing process, but also makes operations like scrolling the drawing to the correct position a very hit and miss affair. ArtWorks can perform screen update in the background - you can scroll or pan the screen as fast as you wish without having to wait for the drawing to catch up. The drawing is being displayed or re-displayed constantly as you move the document.

Multiple window views of any document. Each window may be at any scale and WYSIWYG setting, with a simple zoom in and out control allowing any portion of the drawing to be magnified by a simple click drag operation.

All secondary windows are always rendered in the background so you can carry on editing without having to wait for the display to complete.

Fully RISC OS 2 and 3 compatible, ArtWorks offers all the expected RISC OS support for printer drivers, in-memory transfer of drawings to other programs, support for any screen mode, multi-tasking etc etc.

These are just some of the dozens of points that make the difference between a program that is a frustrating experience to use and one that is a joy to use.

Conclusion

Illustration programs are a cornerstone requirement in many areas of computing, especially in publishing. The Archimedes range excels at desk-top-publishing, now with the release of ArtWorks, it excels in the area of drawing and illustration programs. If you want to draw anything, ArtWorks is the answer.



Sample illustrations

This specification was produced entirely using ArtWorks and Impression. The output was separated by ArtWorks and output to a high resolution imagesetter. All illustrations were produced in ArtWorks and illustrate some of the clip-art included with the package.





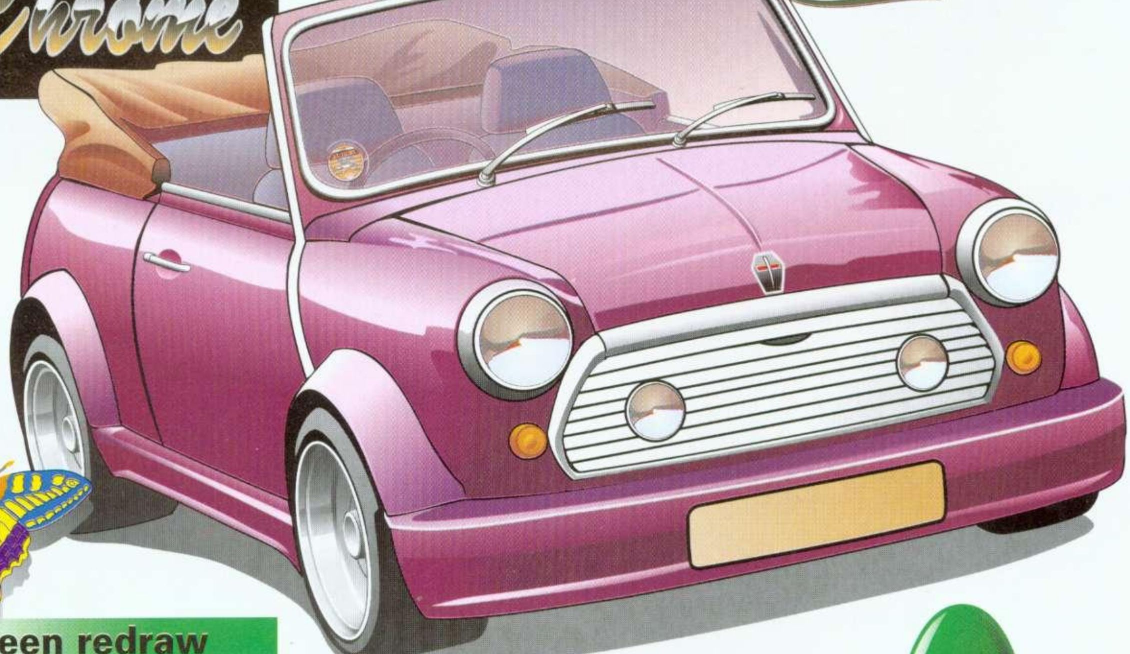


Review

"Having just purchased a 486 computer, no one is more disappointed than I to find that CorelDraw looks pretty pedestrian compared to ArtWorks on an Archimedes"

COMPUTER SHOPPER
August 1992



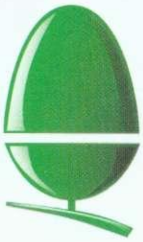




Screen redraw

ARCHIMEDES A5000	6.2 seconds
PC WINDOWS 3.1 486/50	36.3 seconds

THIS IS A TYPICAL ILLUSTRATION SHOWING JUST HOW FAST THE SCREEN RE DRAW IN ARTWORKS IS - USING THE CORELDRAW SNOWBARN CLIP ART AS THE TEST. THE TESTS WERE RUN AT IDENTICAL SCREEN RESOLUTIONS



MONEY BACK GUARANTEE

We are so sure that ArtWorks is the best solution for all your illustrating requirements that we offer a six week 'no quibble' money back guarantee if you buy ArtWorks direct from

Computer Concepts Ltd

Price: £169.00+VAT (£198.57 inc VAT)

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- **R312**-A305/310 – to 2MB RAM Upgrade £99
- **R314**-A305/310 – to 4MB RAM Upgrade £199
- **R412**-A410/1 – to 2MB RAM Upgrade £30
- **R413**-A420/1 – to 4MB RAM Upgrade £60
- **R414**-A410/1 – to 4MB RAM Upgrade £90
- **R810**-A410/1 – to 8MB RAM Upgrade £579
- **R820**-A420/1 – to 8MB RAM Upgrade £549
- **R840**-A440/1 – to 8MB RAM Upgrade £479
- **R814**-R140 – to 8MB RAM Upgrade £499
- **A5000** – to 2MB additional RAM Upgrade £85

Desk Top Publishers

Acorn's Archi DTP Package	**£69**
• **Equasor £39;** • **Expression-PS**	**£19**
Impression 2 DTP Pack	**£123**
Impression Junior	**£69**
Impression Business Supplement	**£39**
Impression II Borders Disc	**£19**

Archi Wordprocessors

Pendown Archi	£48	1st Word Plus – 2	£63
Pendown Outline Fonts	£18	PD Spellchecker	£40
Image Writer	£25	Graphic Writer	£19
		EasiWord	£18

Databases

AlphaBase	£36	Magpie	£40
Flexifile	£79	Multistore v2.01	£176
Knowledge Organiser	£42	Pinpoint	£65

Spreadsheets

Intersheet Disc	£24	Schema	£89

Business Graphics

GammaPlot	£39	Sigmaplot	£39
Interchart Disc	£17		

Integrated Packages

- Pipedream 4 £149
- Desktop Office – Database, Graphs & Charts, Wordprocessor Spreadsheet, Communications £98
- Desktop Folio – Wordprocessor, Desktop & Interactive Publishing. Ideal for school £75

More Archimedes Products See Pages 3, 4, 5, 6, 7, 8

CREDIT CARD 24 HOUR Ansaphone Hot Lines (0923) 250234 or 233383

VISA Access

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Hi-Speed, Low Cost Archi Hard Disc Drive

Watford's advanced interface allows IDE drives to work on any Archimedes machine, speeds in excess of SCSI devices can be obtained at a fraction of the cost of a SCSI drive.

Up to four drives are supported by the IDE filing system IDEFS, up to two drives can be attached to each expansion card, up to four cards can be installed in a machine. An optional 20Mb or 40Mb hard disc can be supplied on the podule expansion card itself, with its fast transfer rate and power saving modes the drive is ideal for storing commonly used software such as the !Fonts application.

A powerful security feature has been provided with the two unique commands *IDELock and *IDEUnlock, ideal for educational establishments where hacking or tempering may be prevalent that may lead to loss of data. Once locked, the configuration can not be changed until a secret password is used. The !IDEForm Write Protect option is particularly useful in conjunction with *IDELock as it will prevent any unauthorised deletion of data.

By an innovative use of on-board memory, the card will remember its configuration, even if moved to another slot or even a different machine, this also includes the unique security features.

Hardware

- Single width EuroCard
- Supports proposed ANSI ATA (IDE) specification
- Fast 16 bit MEMC interface interrupt driven to support background disc operations
- 5 Mbytes per second peak transfer rate
- Built in Non Volatile RAM to hold configuration
- LED activity indicator
- 37 way D type socket for external drives
- Optional on-card 20Mb or 40Mb hard disc
- Up to two drives (master and slave) per card
- Multiple cards per machine (up to four)

Software

- Conforms fully to the Acorn IDE Specification
- All software supplied in ROM
- Filing system 'IDEFS'
- Desktop filer with drive ready detection and disc name under icon
- !IDEForm, WIMP based configuration and formatting software
- Drives can be individually write protected
- Up to four drives over multiple cards
- Power saving standby modes supported with configurable timeout
- Drives can be used without translation in native mode for minimum overhead
- !IDEFSDisk, creates PC emulator hard discs

Prices

Part No.	Capacity	Access Speed	Price
ADA 0520	44Mb	28mS	£215
ADA 0530	100Mb	16mS	£295
ADA 0570	200Mb	15mS	£479
ADA 0580	330Mb	15mS	£849

All the above 3.5" hard drives are supplied complete with Controller Card, cable & Software on ROM. (Internal fitting). For use with A300/A400/A500 series machines.

For A3000 users an additional external Case and PSU will be required.

AAA 0300 External Case & PSU for A3000 **£85**

Internal Hard Disc Drives for A3000

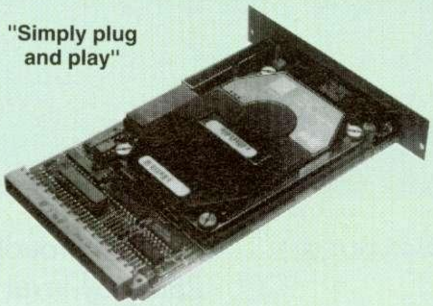
State of the art, 4 layer internal IDE Hard Cards for the A3000. Software supplied in, On-board ROM.

ADA 0700	21Mb	23mS	£185
ADA 0770	30Mb	19mS	£285
ADA 0720	44Mb	19mS	£349
ADA 0750	60MB	18MS	£399
ADA 0730	89Mb	18mS	£619

Supplied ready assembled. No soldering required. Simply plug into the allotted space.

Archi IDE Hard Cards

"Simply plug and play"



Watford's easy to instal, low cost, high performance, revolutionary IDE Hard Cards for the A300 & A400 series Archimedes.

ADA 0650	21Mb	23mS	£199
ADA 0800	30Mb	19mS	£295
ADA 0660	44Mb	28mS	£359
ADA 0810	60Mb	18mS	£409
ADA 0670	89Mb	18mS	£629

(Can be used as a Removable Hard Drive)

NEW Archimedes A300/A400 SCSI Hard Disc Offer

(while stocks last)

100MB Hard Disc Upgrade complete with Controller card, Cables, Formatter and Manuals

RRP: £799

Offer Price: £325

Syquest Removable Disc Units

These Hard Drive units are supplied complete with a cartridge 42Mb removable, cables and a high flow fan for cooling.

- Syquest Drive Unit pack **£399**
- As above + SCSI Card **£415**
- Spare 42Mb Disc **£55**

Archi to BBC Serial Link Mk 2

Using this simple data link, it is possible to solve all your BBC to Archimedes data transfer problems. The kit is supplied with a disk, and the necessary cable to connect the two computers.
New RISC OS Version also available (please specify)

- For A3000 **£15**
- For A5000 **£16**

For A3000 Serial Upgrade **(£19)** required

A3000 I/O Card (User, Analogue & IIC)

This NEW versatile I/O Card from Watford, fits inside the A3000 and includes an Analog to Digital Converter, a User Port, and an InterIC (IIC) connector.

The card allows many of the peripherals developed for the BBC to be used with the Archimedes A3000. The ADC and User Port have the same pin out and connectors as the BBC computers.

Extensive RISC OS software is supplied to provide BBC OSBYTE calls for support of the ADC and User Ports, including the BASIC keyword ADVAL. The software provides extended RISC OS support for separate interrupts from both the ADC and User Ports, permitting easy interrupt driven operation.

The card is provided with all the software in ROM and is automatically loaded when the machine is turned on.

Peripherals connected to the ports can obtain up to 500mA of power at +5V. A fuse is fitted to the card to protect the A3000 from damage arising from accidental short circuit of the power output.

Features

- An 8 bit User Port with a standard 20 way IDC connector, compatible with the User Port on the BBC computers and the Archimedes I/O Podule.
- A 10 bit Analog to Digital Converter with a standard 15 way D type connector, compatible with the ADC on the BBC range of computers and the Archimedes I/O podule.
- An InterIC (IIC) Port with a 5 pin DIN socket to connect the A3000 to external IIC devices.

£42

Minerva's Archimedes Software

EasyWord	£18	Time Tabler	£549
Home Accounts	£35	System Delta	£59
System Delta Program Reference Manual			£29

Stand alone Business Accounts Packages
Sales; Purchase; Order Processing and Invoicing; Nominal; Stock management
£79 per module
or Complete Business Package **£325**

ARM 3 Turbo Card MkII

Simply The Best



Here it is at last – the all new Mark 2 version of Watford's highly acclaimed ARM 3 processor board for the Archimedes and now also the A3000 series computers. Using the latest surface mount technology on a high quality four layer circuit board we have reduced the overall size to a mere 53mm x 45mm, and the cost to only £169. Mk II upgrade will increase the speed of your micro by a factor of 3 to 6.

Any competent A300 or A400/1 series micro owner can fit the upgrade himself, as we provide full fitting instructions and a special ARM chip extraction tool. However for A3000 micros and those not wishing to perform the upgrade themselves, we will collect, upgrade and return your micro by courier service, at an additional cost of £18.

(A300 and old A440 series owners please note – you will need to upgrade to MEMC1A for ARM3 to work.)

RRP £249

Offer Price £169

Acorn have satisfactorily evaluated Watford's ARM 3 upgrade and the A3000 upgrades are fitted by Acorn approved surface mount technology centre, therefore its fitment will not invalidate Acorn's warranty on the micro.

BBC MASTER

MASTER 128K Micro incl. Acorn's View, Viewsheet, ADFS, BASIC Editor & TERMINAL plus FREE OFFER (see below) **£399**

FREE with every BBC Master purchased from us during August

A 5.25" Double Sided, 40/80 track switchable 400K Disc Drive complete with cables and a Utilities disc incl. 2 games, plus

Gemini's OFFICE MATE & OFFICE MASTER

Add-Ons & Accessories

Econet Module for the Master	£42
Twin ROM Cartridge for Master	£9
Quad ROM Cartridge for Master	£14
Master Reference Manual I	(No VAT) £14
Master Reference Manual II	(No VAT) £14
Master Advance Ref Manual	(No VAT) £14
64K Upgrade Kit for B+	£32
Acorn 1772 DFS Kit complete	£49
ECONET Upgrade Kit for BBC B	£42
ALL ECONET UPGRADES Available	
ARIES' IEEE Interface for BBC B & Master	£238
Morley Teletext Adaptor with ATS Rom	£99
Ecolink	£270

Continued→ → → → → → → → →

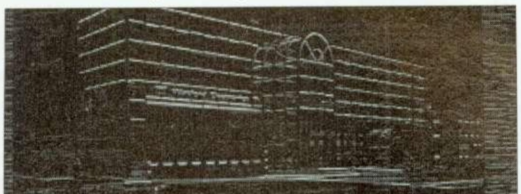
SCANNING ON THE ARCHIMEDES WILL NEVER BE THE SAME

"The image quality which this little beauty can produce is quite stunning."
Archimedes World – July 1992

"Other Arch image grabbers have been irritating or just plain useless..."
"Loads of well written, easy-to-follow and in-depth help, all glued together in a very handsomely designed manual."
Computer Shopper – July 1992



Original Image, 16 Grey Levels



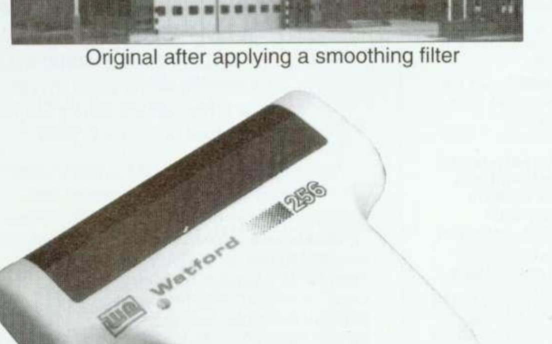
Original after edge filter applied



Original after applying an enhancement filter



Original after applying a smoothing filter



The only sensible scanning and image processing solution for the Acorn Archimedes. Just compare the features, there can only be one choice...

Watford proudly introduces its innovative new 256 grey-level hand scanner, **Scan256,** for the Archimedes range of micro computers. It offers up to 256 grey levels at a maximum of 400 dpi, and comes complete with the most advanced and sophisticated 256 grey scale scanner software currently available for the Archimedes.

Features

- **Multiple copies of the image in memory at once**
  Allows multiple consecutive operations without having to save the original image to disk.
- **Instant re-draw of all 4 image buffers**
  No re-calculations needed unlike other packages that use on the fly screen-dithering.
- **Highly advanced dithering and image size reduction**
  Available via industry standard ChangeFSI package for maximum image quality. An invaluable aid to reduce the size of the image whilst maintaining maximum image quality.
- **Advanced in-built image processing options**
  Convolution digital filtering fully implemented with over 100 filters covering edge detection, image enhancement and image smoothing. Enables high quality images to be obtained from poor quality scans.
- **A unique L.E.D. indicator on the scanner**
  Shows you when the scanner is being moved at close to the maximum scanning speed, not just when it is too late and a scan line has been missed by moving the scanner too fast.
- **Fully adjustable scale and size of image preview when scanning**
  Image preview window can even be behind other windows and preview is shown in real-time with maximum number of grey scales available.
- **Support for 'The Serial Port' Graphics Enhancer**
  Allows up to 256 simultaneous grey scales on screen at once.
- **True brightness, contrast and gamma correction**
  All can be specified by a value to exactly match monitor/printer. No guessing with shapes of curves and correction is mathematically correct.
- **RISC OS 3 features**
  Include rotation and shearing. Scans normally are scanned at a slant rather than being rotated, shearing enables the scan to be corrected better than rotation.
- **Fast RISC OS printing**
  Multiple options such as scale to page, centre, sideways, selected area, and any scale.
- **Scanner scans at an amazing 3ms per line**
  A post card at 400dpi takes only 7.3 seconds to scan, creating over 3Mb of data.
- **Selectable scanning modes**
  256 grey-scale, 256 grey-scale half width, 16 grey-scale and monochrome scanning modes. Half width mode enables longer 256 grey-scale scans to be achieved.
- **Save image in foreign formats**
  Save as industry standard TIFF for exporting to other systems, AIM for further processing, or RISC OS Sprite format.
- **Single width, high quality podule using surface mount technology**

Scan256 Scanner, Interface Card, Software and Manual

Only £185

BBC Educational Software

- Maths with a Story 1 (Disc). 4 primary level maths programs £20.00
- Maths with a Story 2 (Disc). 4 further maths programs. £20.00
- Picture Craft (Disc) 6-14 age group. Pack consists of flexible geometrical design & colouring programs. £17.00
- Computers at Work – Primary £17.35
- Espana Viva – 3 Discs £19.95
- WHITE KNIGHT Chess game £16.00
- A Vous La France £29.00
- Six French Games – Aimed at pupils in their first year of French, but also useful as revision for more advanced students 11 years+ £26
- More French Games – Another 6 games 12 years+ £26
- Au Restaurant and Accident de Route 12 years+ £26
- Boulogne and Oh-Les – 2 programs for beginners £26
- Letters to French Penpals – 11 years+ £26
- French Programs with Henri Beret – The programs in this series present vocabulary, grammar and role-play phrases in the form of animated games. 11-16 £22
- Six German Games – Aimed at pupils in their first year, but useful as revision for more advanced student of German. 12 years+ £22
- More German Games – Aimed at pupils in their 2nd year of learning German. 12 years+ £22
- Computer Control – This is a package of 3 programs simulating control of a greenhouse, a robotic arm & a chemical plant. 14-16 years £26
- PUNCMAN Learning punctuation
  Puncman 1 & 2 for 7 – 13 years £15
  Puncman 3 & 4 for 8 – 14 years £15
  Puncman 5, 6 & 7 for 8 – 15 years £15
- Yes Chancellor – A chance to take over number 11 at Downing Street. 12 years+ £18
- Letters & Pictures – Introduces phonic skills to Infants 6-8 years £15
- Numbers & Pictures – Early number learning is a great fun (4-6 years) £15
- Note Invaders – Budding musicians can learn the notes on the Clef with this elegant game 3 programs (7 to Adults) £15
- Maps & landscapes No. 1 (9-14 years) £18
- Help Your Child learn Basic Map work No. 2 (9-14 years) £18
- Spelling Week by Week (6-14 years) £18

Archi Educational Software

- Animated Alphabet (3-6 yrs) £21
- Arcventure (8-12 yrs) £29
- Bookbinder £43
- Bumper Disc £14
- Bumper Disc 2 £14
- Craftshop 1 £26
- Craftshop 2 £26
- Converta-Key £16
- Data Word £16
- Desktop Stories £35
- DigiSim £35
- Dream Time (5-7 yrs) £23
- Farm (5-7 yrs) £19
- Fleet Street Phantom (9-13 yrs) £25
- Fun School 3 Red (up to 6 years) £17
- Fun School 3 Green (6-8 years) £17
- Fun School 3 Blue (8 years +) £17
- Gate Array Teaching System £68
- Glimpse Clip Art Utility (7-16 yrs) £8
- Highlighter (6-16 yrs) £42
- Jigsaw £28
- Mapventure (9-13 yrs) £24
- Microbugs £24
- Money Matters £16
- Nature Park Adventure (7-9 yrs) £27
- Numerator £60
- Picture Book £16
- Recall (6-13 yrs) £39
- Sellardore Tales £24
- Snippet £26
- Space Mission Mada (9-13 yrs) –
- Sting of the Dump (9-13 yrs) £22
- Target Maths £16
- Viewpoints (9-12 yrs) £33
- Wizard's Revenge (7-10 yrs) £17
- Worst Witch (7-10 yrs) £25

Archimedes Software

GRAPHICS

3D Construction Kit	£39
Arc Light	£46
ARCtist	£19
ARCticulate	£19
Atelier	£65
Artisan II	£45
Artisan Gallery	£16
Autosketch II	£65
Craftshop 1 & 2	£28
Euclid 2	£50
Graph Box	£59
Graphbox Professional	£107
HotLink Presenter	£40
Illusionist	£69
Kermit	£46
Mogul	£17
Poster	£79
Pro Artisan	£70
Prime Art	£69
Render Bender 2	£95
Revelation 2	£80
Snippet	£21
Titler	£119
Tween	£29

GAMES

Air Supremacy	£17
Apocalypse	£14
Arcade Soccer	£14
Boogie Buggy	£14
Break 147 + Supa Pool	£19
Bughunter in Space	£19
Cataclysm	£19
Chess 3D	£16
Chocks Away Compendium	£32
Chocks Away Extra	£14
Conqueror	£15
Corruption	£18
Cyber Chess	£38
Elite	£33
Enter the Realm	£19
E-Type Compendium	£20
E-Type Designer	£13
Family Favourites	£13
Grievous Bodily Arm	£19
Holed Out Designer	£13
Holed Out Golf Comp	£20
Hostages	£14
Inter Dictor 2	£26
Iron Lord	£15
Jigsaw	£27
Lemmings	£20
Lost Temple	POA
Mad Prof Mariarti	£17
Masterbreak	£16
Man at Arms	£14
MahJong Patience	£15
Manchester United II	£19
Mig 29	£24
Nebullus	£21
Nevryon	£14
Nevryon II	£20
Olympics	£14
Pandoras Box	£18
Pipe Mania	£17
Power Band	£14
Puncman 1 & 2	£16
Puncman 3 & 4	£16
Pysanki	£14
Quazer	£10
Real McCoy	£22
Real McCoy 2	£23
Real McCoy 3	£22
Redshift	£14
Return to Doom	£16
Repton 3	£14
Saloon Cars Deluxe	£27
Spitfire Fury	£22
Splice	£25
Sporting Triangles	£24
Superior Golf	£14
Superpool + Break 147	£19
Swiv	£19
Talisman	£12
Timewatch	£24
Trivial Pursuit	£22
Twin World	£15
U.I.M.	£23
White Magic 2	£15
Wimp Game	£13
Worldscape	£16
XFire	£19
Zelanites	£23

Miscellaneous

Ancestry	£59
Arccomm 2	£38
Arcterm 7	£64
Armadeus Sound	£60
Avante Garde Fonts	£23
BBC DFS Reader	£6
Broadcaster Loader	£65
Compression (CC)	£38
Equasor	£38
FlexiFile	£97
Genesis Plus	£68
Genesis 2	£99
Investigator 2	£22
JX Archi Colour Printer Driver for Citizen & Star Printers	£15
Magpie 2	£42
Notate	£42
Numerator	£66
Pin Point	£65
Presenter 2	£29
Presenter Story	£145
Rainforest	£17
Revelation 2	£95
Rhapsody in Blue 2	£45
Score Draw	£46
Show Page	£127
Speech!	£15
The Victorian	£17
Time Tabler	£549
Toolkit (Clares)	£35
Touchtype	£40
Tracker	£39
Turbo Driver BJ10E	£42
Vox Box	£46
WorldScape	£17

LANGUAGES (Archimedes)

ISO-PASCAL; FORTRAN 77 £77 each
Assembler; LISP; Prolog X £149 each

Desktop C	£199	Logotron Logo	£45
Macro Assembler	£40	Risc Basic	£120
Robo Logo	£69	Risc FORTH	£110
BASIC Compiler	£77	Cambridge Pascal	£95

Archimedes External Disc Drive Interface

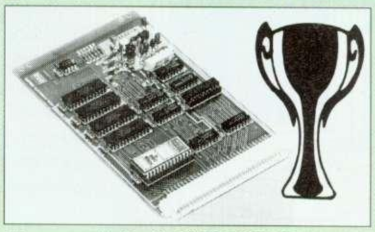
With this interface it is possible to connect almost any 5.25"/3.5" disc drive with its own power supply to the Archimedes. Upto 4 disc drives can be connected. Fully Buffered Board. NO SOLDERING is involved. Supplied complete with necessary lead.

Price £21

Back Plate Extension

- A300/400 £15;
- A3000 £14

Archi Real-Time Digitiser



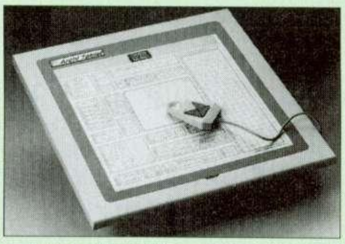
Now supplied with NEW RISC OS Version Software

Watfords' Archimedes Video Digitiser is the most sophisticated digitiser ever designed for a micro. It provides a fast and flexible means of capturing images from a video camera or recorder for display and manipulation on the Archimedes range of Micros. Off-air televison signals may also be digitised via a video recorder or TV tuner. Please write for further details.

Price £119

A Set of Colour Filters for colour image grabbing using a video camera £16

Archi Graphic Tablet



The Archi Graphic Tablet offers performance and accuracy comparable to other tablets priced at well over £400, and has the useful addition of a liftable cover, which can hold tracing material or menu templates securely. The package is supplied complete with sophisticated Archi software. (Now, fully LinCAD compatible. Recommended by Linear Graphic for use in Education).

(FREE this month, PC Mouse Drivers & Art package)

Special Price £199

(Price includes Tablet, Leads, Software & Puck)
Stylus Optional Extra **£20**

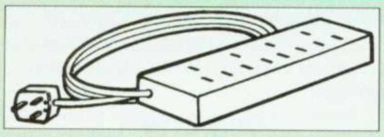
Archi Graphic Tablet Junior. Working area 9" x 6". Price includes Stylus **£125**

Surge Protector Plug

Fitted in place of your normal mains plug, this device protects your equipment (and data from corruption), against mains high voltage translent spikes/surges caused by lightning or thermostats switching.

Protection for only **£8.50**

4 Way Mains Distribution Socket



4 way top quality mains trailing sockets.
Supplied wired up with mains plug ready for use.
Can be screwed to floor or wall if required.
Very useful for tidying up all the mains leads from your peripherals.

£9.50

Aries Spike Cleaner Unit

A 4 way mains distribution unit as above with a built-in Surge Arrester, providing protection for your complete Computer/Hi-Fi System

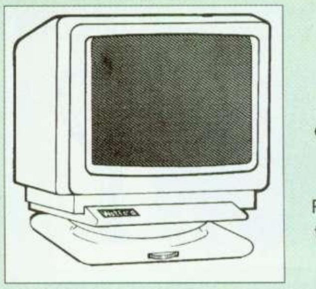
£16

8 Way DIP Switch

Increase the speed of your Disc Drives by soldering this switch to your BBC B or B+ keyboard

Only **£1.00**

Continued→ → → → → → → → →



FREE Connecting lead with every monitor purchased from us. Please specify type required.

Microvitec Monitors

- **1431** – Standard Resolution Monitor £169
- **1451** – Medium Resolution Monitor £209
- **Cub3000** Medium Res for A3000 £189
- Dust Cover for Microvitecs £5.50
- **Touchtec 501 Touch Screen** £239

Now 3 years Parts & Labour warranty on all Microvitec Monitors

Multiscan Colour

Eizo 9060S	£389	NEC 6FG	£1525
Eizo F550i	£725	Taxan 770LR	£362
Eizo T560i	£995	Taxan 787	£249
Eizo T660i-T 20"	£1599	Taxan 795	£397
NEC 3FG	£370	Taxan 875	£679
NEC 4FG	£465	VIDC Enhancer	£25
NEC 5FG	£850		

Aries AlphaScan Monitor

Pound for Pound, the AlphaScan VGA Multiscan monitor provides the maximum performance and greatest flexibility of any 14" colour monitor for the Archimedes micro.

Its multiscan circuitry provides automatic adjustment for frequencies between 30 and 60KHz horizontal, and 50 and 90Hz vertical. Its 0.28mm dot pitch high resolution tube provides super sharp text graphics, while a high speed (70/72Hz) refresh rate provides a flicker-free display easing the eye strain. The Multivideo VIDC Adaptor supplied (free) with the monitor allows high resolution operation in all screen modes. **£325**

- Aries Alphascan 17" Plus £495

Philips Monitors

- **BM7502** 12" Hi-res Green Monitor £67
- **CM8833** 14" Med. Res Colour Monitor £172
- Dust Cover for Philips Monitors £6

STAR BUY

Aries A2000 Colour Monitor

This attractively finished, etched screen medium res monitor is supplied complete with built-in speaker, volume control and video input. All controls are located on the front panel for ease of use. Ideal for BBC, BBC Master, Archimedes and Amiga.

Only £159

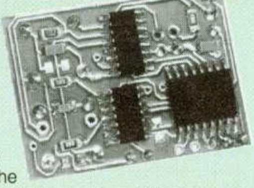
Spare Monitor Leads

BNC Lead for Zenith or Philips	£3
Skart Monitor Lead	£5
RGB lead for TAXAN Monitors	£3
Archimedes Colour Monitor Lead	£7.50

Integrex Ink Jet Printers

- Colour Jet 132 Printer £449
- Paper Roll £6.50
- BBC Screen Dump Software £10
- Colour Cartridge £21
- Black Cartridge £12.40
- 100 A4 OHP transparencies £55
- 8K Serial Interface Optional £123
- Colour Jet 2000 £529
- Betajet Ink Jet Printer £185
- Betajet Cut Sheet Feeder £43

VIDC Enhancer



This unique VIDC add-on board for the Archimedes, caters for all types of Multiscan and VGA monitor and mode requirements. There are 2 versions to suit all requirements. The multimode software supplied, provides all the new modes for the selected monitor type, including the now standard Computer Concepts modes. With VGA monitor, you are no longer restricted to a few modes. A Desk Top application supplied on disc, allows new modes to be designed and existing modes to be modified for particular monitors.

Super VGA VIDC Card: Its unique design allows the horizontal and vertical sync to be buffered and have the polarity changed under software control **£45**

MultiVideo VIDC Card: As above but for MultiScan monitors only. **£25**

SPECIAL OFFER

H P Desk Jet 500C Colour Printer £375*
Archi Printer Driver £15

* Price includes 3 years extended parts and labour warranty at no extra cost.

For 3 years On-Site maintenance £45

Panasonic Printers

KX-P1123	£126	KX-P2180C	£156
KX-P1124i	£170	KX-P2123C	£198
KX-P1170	£99	KX-P2180M	£159
KX-P1624	£270	KX-P2123M	£176
KX-P1654	*£332	Colour Kit for P2180M/2123M	£–
KX-P1695	£270		
KX-P2624	*£270		

*** Price includes 12 months On-site warranty**

Cut Sheet Feeders

P36 – 1124/24i £79 **P37** – 1123/70/80 £69
P38 – P1624/95; P2624 £129

Buffers

P12 4K Buffer Board for KX-P1081 £55
P14 32K Buffer P1123/24/70/80 P1540/92/95; P1624/54/95 £16

Serial Interfaces

P13 for P1123/24/24i/70/80/1624/54/95/2624 £49

Original Panasonic Ribbons

Guaranteed to last 3 million characters

P110 for KX-P1081, 1592 & 1595 £6
P115 for KX-P1180 £7 **P145** for KX-P1124 £7
P140 for KX-P1540 £8 **P155** for KX-P1624 £8
Colour Ribbons for KX-P1081, 1592 & 1595 Brown, Blue or Red **£9 each**
P150C Colour for P2123/2180 £15

Citizen Printers

120D Plus	£95	Swift 24E#	£195
224	£174	Swift 24X	£299
PN-48	£199	24X Colour Opt	£32
Swift 9	£145	PN48 Ribbon	£4

- AH29804 Manual Cut Sheet Feeder for Swift 9/24/124. Holds 50 Sheets £29

\# FREE Colour Option with Swift 24E
\+ FREE 2 years Parts and Labour warranty on all Citizen Printers

- Swift 9 Colour Option £19
- Swift 24 Colour Option £29
- Swift 24 Ribbons Black £4 Colour £13
- Swift 24X Ribbons Black £8 Colour £16
- Citizen/Archimedes Colour Printer Driver £15

Roland Plotters

DXY1100	£490	DXY1200	£620
DXY1300	£825	DXY2500	£2345
Sketchmate A3	£499	Sketchmate A4	£308

- Roland plotter Pens, Fibre tip £7.50

Star Printers

LC15	£175	SJ48 Inkjet	£172
LC20	£102	XB24-200 Colour	*£295
LC24-15	£241	XB24-250 Colour	*£355
LC24-20	£155	XB24 Colour kit	£29
LC24-200	£166	ZA200 Colour	*£240
LC24-200 Colour	£205	ZA250	*£312
LC200 Colour	£143		

- Star/Archimedes Colour Printer Driver £15

* Includes 12 months On-site warranty

Cut Sheet Feeder

LC10/200/24-10	£65	LC15/LC24-15	£125
XB24-10	£80	XB24-15	£139

Serial Interfaces

8K Ser LC-200; LC24-200; FR10; FR15; XB24-10; XB24-15 £52

Buffers

32K Ram Card for LC/XB24-10; 15; LC200 £55

Ribbons

LC10; LC10-II; LC15	Black £4;	Colour £6
LC-200; LC24-200	Black £5;	Colour £12
XB24-10; XB24-15	Black £5;	Colour £12

Laser Printers

All Laser Printers include 12 months On-site maintenance

Brother HL-4	4ppm	£499
Brother HL4-V	4ppm	£640
Brother HL4-PS Postscript	4ppm	£1040
Brother HL8-V	8ppm	£984
Canon LBP4 LITE	4ppm	£495
Canon LBP4+ 1.5M RAM	4ppm	£639
Canon LBP-8III Plus	8ppm	£960
Epson EPL4300	4ppm	£590
Epson EPL4000	6ppm	£485
Epson EPL7500	6ppm	£1145
Epson EPL8100	10ppm	£960
HP Laserjet IIP+	4ppm	£525
HP Laserjet III	8ppm	£1010
HP Laserjet IIID	8ppm	£1495
HP Laserjet IIIP	4ppm	£685
HP Laserjet IIIsi	16ppm	£2515
NEC Silentwriter S62P P/script	6ppm	£1070
NEC Silentwriter 266	8ppm	£670
NEC Silentwriter 290P P/script	8ppm	£1389
Panasonic KX-P4410	5ppm*	£529
Panasonic KX-P4420	8ppm*	£618
Panasonic KX-P4430 Satin Print*	5ppm*	£590
Panasonic KX-P4451	11ppm*	£1085
Panasonic KX-4455 Postscript	11ppm*	£1450
Star LP-8 III 2	8ppm	£1249
Star LP-8 III	8ppm	£905
Star LP-8 Star(post)script	8ppm	£1135
Star LP-4	4ppm	£565
Star LP-4 Mk 3	4ppm	£649
Star LP-4PS Postscript	4ppm	£775

* Now with 2 years On-site warranty

Laser Toners

Canon 2, 3 & 4	£46	Star LP4/LP8	£56
Epson GQ	£13	KX-P4420/50	£19
EPL 4100	£69	Laserjet HP IIP & IIIP	£42
EPL7100/7500/8100	£125	Laserjet II/D, III/D	£48
		Qume Crystal (3)	£58

Laser RAM Upgrades

IIP; III/P 1Mb	£51	EPL7100 256K	£39
IIP; III/P 2Mb	£88	GQ5000 512K	£42
IIP; III/P 4Mb	£135	KX4420/50 1M	£75
II & IID 1Mb	£64	KX4420/50 2M	£115
II & IID 2Mb	£99	KX4420/50 4M	£195
II & IID 4Mb	£146	Star LP8 1M	£139
Canon LBP4 1M	£105	Star LP8 2M	£275
Canon LBP8 2M	£125		

Laser Drum & Developer

Epson Drum	GQ5000 £93	EPL7100	£129
Panasonic 4420 Drum	£60	Developer	£59
Panasonic 4450 Drum	£93	Developer	£80
Qume Drum	£76	Developer	£56

Jetpage Postscript Cartridge

- HP IIP/III £225 IID & IIID £227

Various Add-Ons

- Laserjet Appletalk Interface £135
- HP Adobe Postscript £399
- Pacific Page Postscript £259
- HP Premier Font Collection £28
- Laserjet various Font cartridges from £45

Hewlett-Packard Printers

# Desk Jet 500	£270	*Paintjet XL 300	£1785
Desk Jet 500 Col.	£375	*Quiet Jet Plus	£382
*Paint Jet Colour	£518	*HP Think Jet	£265
*Paintjet XL	£1196	*HP Deskwriter	£299

3 years extended Parts & Labour warranty **FREE**
* Price includes 12 months on-site warranty

- DeskJet 500 Cart. Black **£15;** Colour **£27**
- Paintjet Cartridges Black **£19;** Colour **£23**
- Desk Jet 500 256K RAM cartridge **£69**
- HP Epson FX Emulation Cartridge for Desk Jet **£59**
- DJ 500 High Capacity Black Cartridge **£21**
- DJ 500 Colour Archi Printer Driver **£15**

Plug In Font Cartridges for DJ 500

- 22706B – Prestige, Elite, Line Draw fonts **£55**
- 22706C Letter Gothic & HP Line Draw fonts **£56**
- 22707P – Proprint Emulation Cartridge **£57**
- Desk Jet Unlimited (Book No VAT) **£19.75**

Canon Bubblejet Printers

	Printer	CSF	D'ble Bin	Ink Cart
BJ10EX	£165	£43	–	£16
BJ20	£247		–	–
BJ300*	£284	£88	£65	£12
BJ330*	£376	£110	£79	£12
BJC800C	£1395	–	–	–

* Includes 12 months On-site warranty

- Spare Battery pack for BJ10E **£33**
- BJ10EX – Archi Turbo Driver **£42**

Special Offer:
Canon BJ10EX Printer + CC's Turbo Driver **£210**

NEC Pinwriter Printers

- P20 **£178**
- P70 **£396**
- P30 **£237**
- P90 **£605**
- P60 **£322**
- P60/70 Colour Option Kit **£59**
- Ribbons Black for P20/30 **£6** for P60/70/90 **£7**
- Ribbons for P60/70/90 Black **£9** Colour **£13.50**

Cut Sheet Feeders
P20 **£59;** P30 **£85;** P60 **£89;** P70/90 **£80**

Epson Printers

DFX5000	£1075	LQ1170	£432
DFX8000	£1940	LQ2550+	£675
FX850	£258	LX400	£95
FX1050	£327	LX850+	£138
LQ100	£147	LX1050	£206
LQ570	£201	SQ870	£415
LQ870	£357	SQ1170	£565
LQ1060 Colour	£585	SQ2550	£625
LQ1070	£310		

Cut Sheet Feeders for

LQ570, LQ870 **£47**
LX400/850/LQ200/400/450/500/550
LQ1010/1070/1170 **£72**
LX1050 **£115** FX850/LQ860 **£128**
FX1050/LQ1060/SQ850 **£155**
LQ2550 **£299** SQ2550 **£210**

Tractor Feed for
LQ800 **£44;** LQ850/FX850 **£69;** LQ1050/ FX1050 **£85;** LQ2500 **£90;** LQ2550 **£90.**

Accessories

- EX800/1000 Colour Option **£45**
- EX800/1000 Colour Ribbon **£14**
- LQ2500 Colour Option **£65**
- Multifont Card for LQ550/850/1050 **£95**

Epson Printer Interfaces
RS232 **£28** RS232 + 2K Buffer **£52**

Printer Leads

BBC Centronics 4' long	£5
BBC Centronics 6' extra long	£7
Compact's Special Centronics Lead	£7
Nimbus Centronics Lead	£6
IBM/Archimedes Parallel Lead 6'	£5
IBM/Archimedes Parallel Lead 5 metres	£10
IBM/Archimedes Parallel Lead 10 metres	£15
Double Ended 36 way Centronics Lead 4'	£7
Double Ended 36 way Centronics Lead 6'	£9
RS232 Leads (Various)	P.O.A.

Laser Direct

- Special High Res Card 600 DPI for Canon LPB 4 & LPB 8 Laser Printers **£315**
- LPB 4 Printer plus High Res Card **£975**
- LPB 8III Printer plus High Res Card **£1275**
- LPB 4 Optional Paper Tray **£79**

Fujitsu Printers

B-100	£205	DL1100	£217
B-200	£270	DL1100 Col	£267
DL-900	£181	DL1200	£363

Ribbons
DL900/1100/1200 Mono **£5** Col. **£11**
B-100/200 Ink Cartridge **£15**

Concept Keyboards

Standard A3 Keyboard with BBC Software	£138
Standard A4 Keyboard with BBC Software	£109
Archi A3 Keyboard	£139
Archi A4 Keyboard	£110

Listing Paper (Perforated)

- 1,000 Sheets 9.5" x 11" Fanfold Paper **£7**
- 2,000 Sheets 9.5" x 11" Fanfold Paper **£11**
- 1,000 Sheets 9.5" x 11" NCR 2 Part Fanfold **£21**
- 1,000 Sheets 15" x 11" Fanfold Paper **£9**
- 2,000 Sheets 15" x 11" Fanfold Paper **£16**
- 1,000 Sheets true A4 Fanfold Paper 70gms **£11**
- 2,000 Sheets true A4 Fanfold Paper 70gms **£21**
- Teleprinter Roll (Econo paper) **£4**
- Telex Roll 50 metre **£3**

(All our Fanfold paper is Micro perforated leaving a smooth clean edge when the tractor feed strips are detached).

Carriage 1K Sheets £2.50, 2K Sheets £3.00

Printer Labels

(On continuous fanfold backing sheet)

1,000 off, 90 x 36mm (Single Row)	£6.00
1,000 off, 90 x 36mm (Twin Row)	£6.25
1,000 off, 90 x 49mm (Twin Row)	£7.50
1,000 off, 102 x 36mm (Twin Row)	£6.75

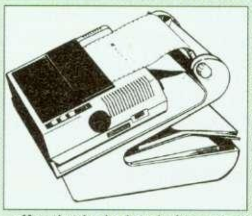
Laser Printer Labels on A4 Sheets

3750 off, 70 x 29mm (3 Rows x 10)	£15.50
2400 off, 70 x 37mm (3 Rows x 8)	£15.25
2625 off, 70 x 42mm (3 Rows x 7)	£15.00

Printer Ribbons & Various Dust Covers

Type	Ribbons	Dust Covers
BBC B/BBC Master	–	£4.00
Archimedes Micro pair	–	£9.00
Citizen 120D	£2.75	£4.50
DMP2000/4000	£3.75	£4.95
EX800/1000	£3.50	£5.00
RX/FX80/85/800/MX80	£2.95	–
FX/MX/RX100/1000	£3.95	–
Kaga/Taxan KP810/815	£3.25	£5.00
LQ400/500/550/800/850	£3.25	£6.00
LQ1050/LQ2500	£12.00	–
LX80/86	£2.75	£4.50
LX400/800/850	£3.50	£5.00
M1009/GLP	£2.95	£3.75
NEC P2200	£4.50	£5.00
Panasonic KX1080/81	£6.00	£5.00
Panasonic KX-P1124	£7.00	£5.00
Star LC24-10	£2.95	£6.00

Professional Printer Stand



The professional printer stand takes hardly more space than your printer. Due to the positioning of the paper feed and re-fold compartments ie. one above the other, the desk space required for your printer functions is effectively halved. Its ergonomic design ensures smooth paper flow and automatic refolding.

80 Column version £24 (carr. £3)
132 Column version £29(carr. £4)

Universal Printer Sharers/Changer

Connect up to 5 Micros to 1 printer or 5 printers to 1 Micro with our combined, Sharer/Changer switch boxes.

Standard Low Cost Type

Connects	Serial	Parallel
• 2 to 1	£10	£11
• 3 to 1	£13	£14
• 4 to 1	£16	£17

Professional Type

Connects	Serial	Parallel
• 2 to 1	£17	£18
• 3 to 1	£22	£25
• 5 to 1	£34	£38

Cables extra at £6 each

Cross Over Manual Switch

2 In/2 Out Parallel	£29
2 In/2 Out Serial	£28
3 In/2 Out Serial	£36

Auto Printer Sharer

Connects	Serial	Parallel
2 to 1	£40	£45
4 to 1	£62	£49
8 to 1	–	£89

256k Multi Spooler

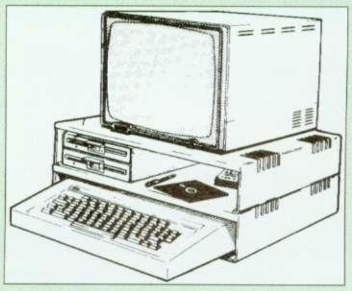
These Auto Parallel Printer Sharers have built-in 256K of Printer Buffers. They can be used as Auto Sharers, Printer Buffers or both.

- 2 In/2 out **£135**
- 4 In/2 out **£169**
- 8 In/1 out **£199**

Compact Converter Units

Serial to Parallel **£36** Parallel to Serial **£37**

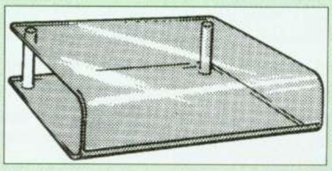
Plinths for the BBC B, BBC Master & A3000



Protect your computer from the heat of your VDU. Our micro plinths have slots for maximum ventilation. The single plinth is suitable for a BBC and VDU, whilst the double height version provides enough room for our stacked disc drive and other peripherals like, Eprom programmer, music unit or simply discs & stationery. The computer slides neatly in the lower section allowing easy access to remove the lid. Colour: Matching BBC Beige.

- Single BBC Plinth 420 x 310 x 105mm **£13**
- Double BBC Plinth 420 x 310 x 210mm **£24**
- Single Master Plinth 490 x 310 x 105mm **£14**
- Double Master Plinth 490 x 310 x 210mm **£26**
- A3000 Single Plinth (very sturdy & precision made), has a slot on the left for the switch & cut out on the right for 3.5" Disc Drive **£15**

Perspex Printer Stand



Give your Computer System a touch of Class with our elegant, smoke finished Perspex Printer stand.

80 Column version **£16** (carr £3)
136 Column version **£20** (carr £4)

Continued→ → → → → → → → → →

QUEST MOUSE Mk III

- Quest Mouse III & Quest Paint £59
- Quest Mouse III, Quest Paint, AMX Stop Press & Pagefont £89
- Quest Mouse III only £30
- Quest Paint Software only £34
- Quest Font Disc (22 Text Fonts) £15
- Quest Mouse Mat (Red or Blue or Green please specify) £3
- Quest Colour Dump Disc – This new software allows you to print direct from Quest Paint to your Integrex Colour Printer £18

(P.S. Quest Paint is not compatible with BBC Compact)

Quest Paint is the winner of the BBC Acorn User 1990 Award for the Best Art/Graphics software

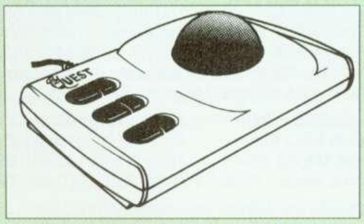
ConQuest

Quest combined with ConQuest and Acornsoft GXR ROM make up THE MOST POWERFUL drawing packages available for the BBC range. Quest Paint is able to take advantage of almost any additions to your machine, such as Shadow or Sideways RAM. ConQuest takes this principal even further, by utilising the otherwise normally incompatible Sideways RAM facility by holding pictures in them.

ConQuest ROM Package £30
(Price includes software in ROM and a comprehensive Manual).
(Not Compatible with BBC Compact)
(P.S. Conquest is a Quest Paint extension ROM).

Quest – Tracer ball

An attractively finished, extremely reliable, mouse replacement, input device. Requires very little desk space. Connects directly to your BBC B, BBC Master or Archimedes Micro.



QT-10 BBC/Master Version **£25**
QT-20 Archimedes Version **£26**

Mouse Cleaning Kit

To obtain trouble free operation and prolong the life of your mouse, the high tech rodent requires regular cleaning. Our deluxe mouse cleaning kit is ideal for the purpose £3

CREDIT CARD 24 HOUR Ansaphone Hot Lines (0923) 250234 or 233383

Archi Mouse Port Splitter

Our handy little splitter unit eliminates the risk of damaging your micro due to constant plugging and unplugging of the mouse by allowing you to connect both, a joystick and a mouse simultaneously to your Archimedes. £15

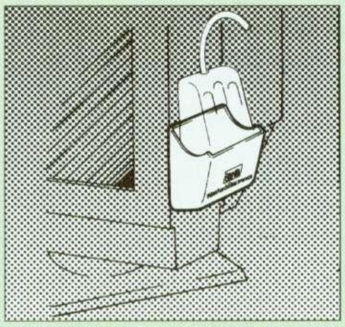
Mk III AMX MOUSE

- **AMX Mouse plus Super Art £54**

(Please specify for BBC, Master or Compact)

- AMX MOUSE ONLY £29
- AMX SUPERART Package £29
- AMX STOP PRESS – A Desktop publishing software. Works with Keyboard, Joystick or a mouse £25
- PAGE-FONTS – Over 20 Fonts for use with AMX Pagemaker £13
- AMX DESIGN (ROM) £29
- AMX EXTRA EXTRA £16
- MOUSE MAT £3

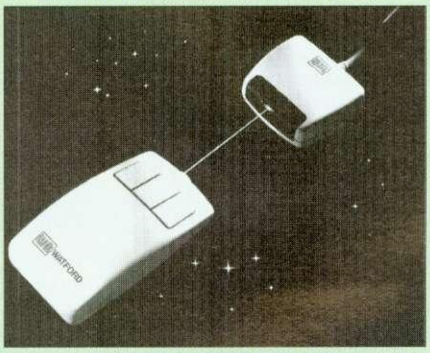
WE Mouse House



Treat your mouse to a cosy Mouse House. This handy little gadget solves the problem of where to store your mouse when it is having a rest. Made of sturdy plastic, the WE Mouse House attaches to the side of your computer, monitor, disc drive etc.

Only £3

Archi Cordless Mouse



Features
- Infra Red Signal Transmission
- High Resolution 200 DPI
- High Tracking Speed of 600mm/s up
- Anti-static Silicon Rubber Coated Ball
- Low Friction Teflon Footpads
- Power - by two AAA size batteries (not included)
- Automatic Standby Mode after 5 seconds inactive
- Auto Power Shut-Down after 20 seconds inactive

Price £39

BEEB VIDEO DIGITISER



"Test Bureau Approved for Use in Education"

Using any source of composite video (colour or monochrome) and the Watford Beeb Video Digitiser, you can convert an image from your camera into a graphics screen on the BBC Micro. This uses the full graphics capacity of the BBC micro in modes 0, 1 or 2. The video source may be a camera, video recorder or television, and is connected via the video output socket. The software supplied includes a sophisticated, fast screen dump routine.
Images produced can be compressed, stored to disc, printed on an Epson compatible printer, directly used to generate graphics, analysed for scientific and educational use or converted to other formats e.g. Slow Scan TV or receiving a picture from a remote camera using a modem. The output from the digitiser exactly matches the graphics capability in each mode, with up to 8 levels of grey in mode 2. The unit connects into the User Port and automatically scans a complete picture in 1.6 seconds.

£99

(BBC B+ and Master compatible, except Master with Econet)

(Price includes) Digitiser Unit, Software in ROM & a Comprehensive Manual)

Beeb Hand Scanner

Hand-held Scanner for the BBC Micro



Watford Beeb HandScan is a compact unit which will allow photographs, diagrams, or any other documents to be digitised quickly and easily, to then be used in a desk top publishing package, art program, or even in your own Basic programs!

The HandScan plugs directly into the 1MHz bus on the BBC while a comprehensive set of utilities provided by the sophisticated ROM firmware. The scanner has a resolution of either 100 DPI or 200 DPI when accuracy is essential. Pictures as wide as 4" may be scanned in mode 0 and various types of dithering may be selected to simulate the grey levels of a scanned picture.

All necessary software has been included in the firmware to allow the scanner to read images directly into our Wapping Editor with little more than the click of the mouse. The digitised picture may then be incorporated into your magazine, newsletter, report or any other document.

Beeb HandScan & Firmware **£99**



Winner of the BBC Acorn User 1990 Award for the Best DTP/Word Processor

The Wapping Editor

The Wapping Editor from Watford Electronics represents a breakthrough in Desktop Publishing for the Beeb. The package includes a 64K ROM containing ALL the software needed to get into print fast; a very sophisticated graphics module, professional quality typesetting software, a word processor, a comprehensive font editor for designing your own typefaces, and a variety of printer dumps. This mouse-driven system is designed for the BBC B, the B+ and Master computers and will take full advantage of any Sideways and Shadow RAM that may be fitted. It will run under DFS, ADFS and Network filing systems and requires as a minimum just a single 40 track drive.

Included with the system is a utility disc containing several high quality fonts, various utilities and a ROM image of a Support ROM. A comprehensive 100 page manual completes the package. The Support ROM contains routines to allow an area to be rotated to any angle or distorted to any four-sided shape. Also included are facilities to draw ellipses at any angle and sectors, segments and arcs (in Master or BBC B with Acorn GXR). Another of the features of the Support ROM is a 'Turbo DFS' which gives DFS access times comparable with those of ADFS.

Page Layout Section

The Wapping Editor may be used to create pages of any size from an A6 to a full A3 page. If none of the eight default page types suit your purpose, the stand-alone page creation program may be used to create pages to your own requirements. By using proportionally spaced fonts and genuine microspacing it is possible to print over 150 characters across an A4 page. A unique feature of the Wapping Editor is the 'A5 x 2' page size allowing two A5 pages to be printed side by side onto a single A4 sheet.

The graphics module incorporates the facilities like: pencil, brush, airbrush, polygon, circle, eclipse, fill, cut & paste, etc.

Text may be typeset, either justified or unjustified, in any font anywhere on the page. Simply select which font and text document you wish to use, and pull out a rectangle on the page where you want the text to be – it's as simple as that! Multiple columns may be printed just as easily and a special 'expand' feature may be used to expand the microspacing so that the document exactly fits the space defined.

Word-Processor

The integral word processor is the ideal tool for producing your text documents, although text can of course be read in from any of the other popular word processors such as View, Wordwise etc.

The Font Editor

The font editor module will allow you to design your own typefaces or to modify the ones provided on the utility disc. This sophisticated editor has numerous functions designed to take the tedium and frustration out of producing good looking, well balanced fonts. Each character may be individually proportionally spaced and characters of any size up to 16 x 16 pixels may be defined.
Pictures may also be 'grabbed' from a video source by using the Watford BEEB Video Digitiser.

Wapping Editor Software Pack £49
Wapping Editor plus Mouse £69

(Wapping Editor only works with Master Compact if a Mertec Expansion box is fitted)

Wapping Art Disc

Over 250K of clip art to cut and paste into your Wapping Editor pages. Pictures include maps, transport, people, media, sport, games etc.
Two 'ratio' screens for use with hi-res and rotated A5 pages to ensure images are not distorted when printed out.

Music writing symbols in the form of pattern and brush for quick production of manuscripts are included together with staves.

There are two prepared hi-res pages laid out for printing labels, both single and double width. Ready made label designs are included but these can be easily replaced with your own designs.

A Mode 0 screen dump routine is also included. To pack such a large amount of data onto the discs the screens have been compressed and routines to compress and expand Mode 0 screens are included on both discs. Using the packing routine you can archive large numbers of screens onto a single disc.

£15

Wapping Font Disc 1

Sixteen additional fonts, including smaller version of Oberon and Daisy and two new sizes of the standard font for the Wapping editor.
Also included are three Mode 0 screens containing giant 'headline' fonts to cut and paste to create extra smooth headlines.
Supplied complete with instructions.

£12

Wapping Font Disc 2

This new addition to our Wapping range of DTP software provides you with additional 23 fonts for the Wapping Editor DTP pack. (80 track discs only).

£13

Archi A4 Scanner

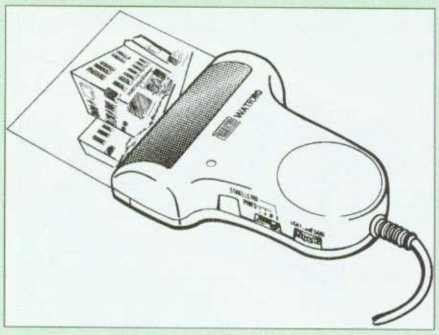


This most advanced Archi A4 image scanner is supplied complete with ROM based podule software. Features provided include facilities for zooming in on an image and inverting the image in X and Y directions, saving and printing of the sprite created. Interactive help is supplied using the !HELP application on the Acorn applications discs. The 216mm scanning width can cope with both desktop scanning of single sheets, photographs, diagrams, etc., with its fast ten page automatic document feeder, but it can also detach from the feeder to become a convenient hand-held full page scanner for larger documents or pictures.
Scanned image control can be freely adjusted in increments of 10 dots per inch from 100 up to 400 dpi resolution with 64 levels of grey scaling. A built in shading controller and manual brightness control achieve optimum image clarity.
Unlike some scanners, which use a red light source, the Watford scanner uses a yellow/green source which vastly improves the light/dark contrast, thus eliminating the effect where any red-based colours are faded down to white and so do not show up in the scanned image.
All these features and facilities combine to make the Archi Page Scanner the fast and convenient way in which to add that extra impact, interest and clarity to documents, reports, instruction sheets, manuals, news letters, etc., from your Archimedes DTP package.

New Low Prices:

Archi A4 Scanner	£269
Sheet Feeder for above	£75
Scanner + Sheet Feeder	£359

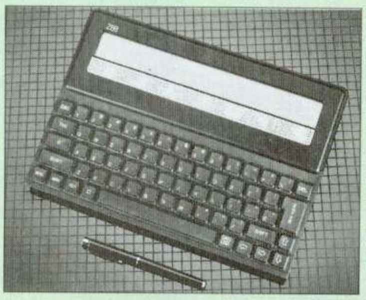
Archi Mk II Hand Scanner



Watford's Mk II hand scanner has a maximum resolution of 400 dpi. The scanning width is 4". The sophisticated software is supplied in a 64K ROM, located on a standard single width expansion podule. As you scan a page, the image appears in the scanning window on the screen, scrolling up in real time. Other facilities include Cropping and scaling to any size including stretching and squashing in X and Y directions separately. Colour tinting. X and Y flip. Edge detection which turns solid objects into outlines.
Images can be printed on any printer supported by RISC OS.
On-screen help is provided via the RiscOS interactive help facility. (Please write in for full technical details).

AHS-4 Archi 300/400 Version £109
AHS-3 Archi A3000 Version £119

Z88 Portable Micro

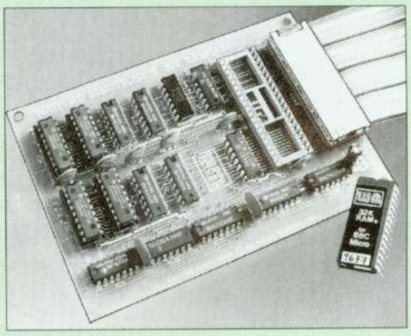


- Z88 Portable Micro £179
- 32K RAM Pack or 32K EPROM Pack £16
- 128K RAM Pack or 128K EPROM Pack £32
- 512K RAM Pack £86
- 256K Eprom Pack £55
- Z88 Eprom Eraser Unit £38
- Z88 Carrying Case £8
- AA Nicad Rechargeable Battery £1.50
- Battery Charger Compact & Fast £6
- Z88 Serial Printer Cable £8
- Z88 Parallel Printer Cable £18
- Z88 to Archi Link £15
- Z88 to BBC Link £8
- Z BASE £56
- Z88 to PC Link II £27
- Z88 to Macintosh £32
- Z88 Mains Adaptor £9
- Z88 Modem £114

CREDIT CARD 24 HOUR Ansaphone Hot Lines (0923) 250234 or 233383

Continued→ → → → → → → → → →

32K Shadow RAM/Printer Buffer Card Expansion Board



A MUST FOR WORD PROCESSING

Simply plug the ribbon cable plug into the 6502 socket and gain a massive 32K of extra RAM.

- "VIEW" Wordprocessor users can now type in letters in 80 columns and have up to 28K bytes free – 5 times as much as normal.
- In WORDWISE (or WORDWISE-PLUS), preview in 80 columns with the full 24k of text in memory. This product is recommended as an ideal complement by Computer Concepts.
- Use the full 32k or the bottom 12K of the expansion RAM as a printer Buffer. (P.S. Only 12K printer buffer can be used with Wordwise & WW+, due to the way they are written).
- Unique facility to turn ROMs off and on again.

Only £54

- **ARIES B-32 Shadow RAM Card £55**

Commander Joystick



Features:

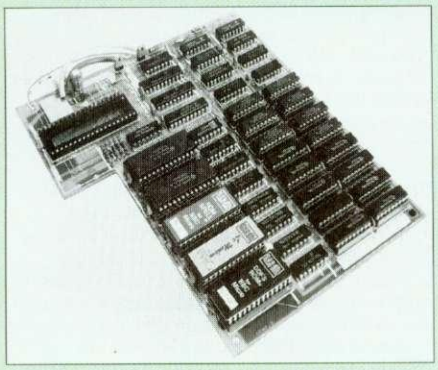
- Direct connection to BBC Analogue input port – no interface needed.
- Fully compatible with all BBC Joystick controlled games programmes.
- Switchable springs allow selection of floating or centring operation.
- Trim adjusters for both X and Y axes for fine centre adjustment.
- Convenient stick mounted fire button with additional base buttons.

Price: £15

Voltmace Joysticks

Delta 3B Single Joystick	£10
Delta 3B Twin Joysticks	£15
Delta 3C Joystick for Compact	£10
Delta 14B Single Joystick	£11
Delta 14B/1 Adaptor Module	£12
Transfer Software Disc-Tape	£7
Delta-Cat A mouse eliminator Joystick for the Archimedes	£24
Analogue aircraft style yoke Joystick to run in the analogue port of the BBC B & Master 128	£25

ROM/RAM Card



- NO SOLDERING required to fit the board.
- Fully buffered for peace of mind.
- Compatible with BBC micros (not BBC+ or Master).
- Total number of ROMs increased from 4 to 8.
- Up to 8 banks of sideways RAM (dynamic).
- Option for 16k of battery backed CMOS RAM (CMOS RAM needs one ROM socket).
- Software Write protect for ALL RAM.
- Read protect for CMOS RAM.
- Separate RAM write register (&FF30 to &FF3F).
- Automatic write to currently selected RAM socket for convenience.
- FREE utilities disc packed with software.
- Large printer buffer.
- UNIQUE fully implemented RAM FILING SYSTEM (similar to the popular Watford DFS).
- ROM to RAM load and save facilities.

The SFS (Silicon Filing System) can utilise up to the full 128k of RAM (with the SFS in any paged RAM) as a SILICON DISC. This behaves as a disc drive, with all the normal Watford DFS features (including OSWORD &7F for ROMSPELL, etc.) to provide an environment that looks like a disc but loads and saves MUCH faster.

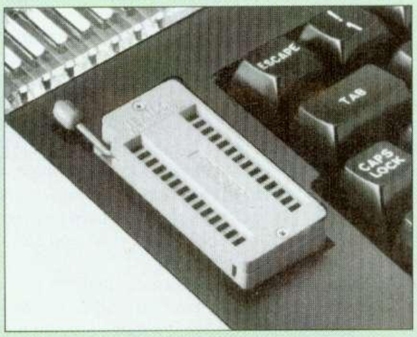
PRICES:

• ROM/RAM card with 32k DRAM	£42
• ROM/RAM card with 64k DRAM	£54
• ROM/RAM card with 128k DRAM	£89

OPTIONAL EXTRAS:

• 16k plug-in Static RAM kit	£8
• 16k DRAM for Upgrade	£13
• Battery backup	£3
• Read and Write protect switches	£2 each
Complete ROM-RAM card with all options fitted	£109

Sideways ROM ZIF Socket System



Allows you to change your ROMs quickly and efficiently, without having to open the lid. The ZIF socket is located into the ROM Cartridge's position. It is very simple to install. No soldering required. Also included in the price is a plastic see through storage case with antistatic lining, which allows you to store 12 ROMs.

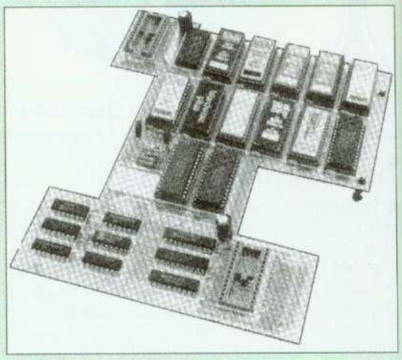
£18

ROM Cartridges for the BBC Master

Will accept the larger Piggy Back ROMs like Interword, Quest, etc.

• Twin **£8;** • Quad **£13**

Solderless Sideways ROM Socket Board



- Increases your BBC Micro's ROM capacity from 4 to 16.
- **No soldering required.**
- Socket 14 takes two 6264 RAM chips.
- Read protect to make RAM "Vanish" allows recovery from ROM crashes.
- Battery backup option for RAM chips.
- Supplied ready to fit with comprehensive instructions.

Price: Only £35

Battery Backup fitted **£39**

Battery Backup only **£3**

16K Sideways RAM **£8**

- Sideways RAM Utilities Disc for Solderless ROM Board. Includes the options to load and save ROM Images and the facility to use Sideways RAM as Printer Buffer.

Only: £8

Connecting Leads

(All ready made and tested)

CASSETTE LEADS 7 pin DIN Plug	
to 3 pin DIN Plug + 1 Jack Plug	£2.50
to 7 pin DIN Plug	£3.00
to 3 Jack Plugs	£2.50
6 pin DIN to 6 pin DIN Plug (RGB)	£3.00

Disc Drive Power Leads

Supply from BBC power supply to standard Disc Drive Connection: Single **£3.00;** Dual **£3.75**

Disc Drive Interface Leads

BBC to Disc Drives Ribbon Cable Single **£4** Twin **£6**

Miscellaneous Connectors

	Plugs	Sockets
RGB (6 PIN DIN)	50p	75p
RS423 (5 pin Domino)	70p	80p
Cassette (7 pin DIN)	40p	95p
ECONET (5 pin DIN)	35p	50p
Paddles (15 pin 'D')	150p	250p
Disc Drive Plug 4 way	100p	–
6 way Power Connector	120p	150p

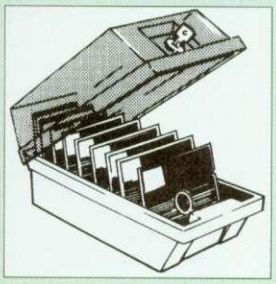
Watford DATA DUCK

Convert two single Disc Drives into one Dual Drive with this simple external unit (Suitable for Disc Drives with PSU. For Disc Drives without PSU, you will also require Watford Power Duck, see below).

£14

Watford POWER DUCK **£8**

Antistatic Lockable Disc Storage Units



- **M35** – holds up to 50 5.25" discs **£4.95**
- **M85** – holds up to 95 5.25" discs **£6.95**
- **M25*** – holds up to 25 3.5" discs **£4.95**
- **M50** – holds 50 3.5" discs **£6.50**
- **M100** – holds 100 3.5" discs **£6.99**
- **M10** – holds 8 of No. 10 Data Cartridges **£15**

* Not lockable

Disc Plonker Rack



When using ones micro, there is a tendency to have more than one Disc on the desk. This exposes them to the hazards of fingerprints, scratches, dust, coffee and an untidy desk. Why not protect your valuable data from all these hazards with the help of our extremely handy and low cost DISC PLONKER RACK. Holds up to eight 5.25" discs.

Protection at Only: **£2**

3M – Diskettes

Lifetime warranty on 3M Discs

- *10 x 5.25" S/S D/D 40T (744)* — *£5*
- *10 x 5.25" D/S D/D 40T (745)* — *£5*
- *10 x 5.25" S/S D/D 80 Track (746)* — *£7*
- *10 x 5.25" D/S D/D 80 Track (747)* — *£7*
- *10 x 5.25" 1.6M D/S D/D High Density for IBM XT and AT* — *£8*
- *10 x 3.5" S/S D/D 40/80 Track* — *£6*
- *10 x 3.5" D/S D/D 40/80 Track* — *£6*
- *10 x 3.5" Double Sided High Density* — *£11*

Top Quality Diskettes

Watford's life time guaranteed disc are supplied complete with self stick labels & plastic library case.

- *10 x **M3** 3.5" D/S D/D 80 Track* — *£6*
- *10 x **M9** 3.5" D/S High Density* — *£10*
- *10 x **M4** 5.25" S/S D/D 40 Track* — *£5*
- *10 x **M5** 5.25" D/S D/D 40 Track* — *£5*
- *10 x **M7** 5.25" D/S D/D 80 Track* — *£6*
- *10 x **M8** 5.25" D/S H/D Hi-Density* — *£9*
- ***M2** 3" Double Sided* — *£2.50 each*

Special Bulk Offer Discs

(Lifetime warranty on Discs)

BULK PACK DISCS in lots of 100

Type	S/S 40T	D/S 40T	D/S 80T
• Without Sleeves 5.25"	£25	£30	£35
• With Sleeves 5.25"	£28	£33	£38
• 3.5" D/S D/D	–	£44	£78

3.5" Disc Drive



These top quality 3.5" Double sided, 80 track, are attractively finished in BBC beige. They are supplied complete with all cables and a Utilities Disc.

Type	Description	
	Disc Drive without PSU	
• **CLS35:**	Single Disc Drive, 400K	**£59**
• **CLD35:**	Twin Disc Drives, 800K	**£109**
	Disc Drive with PSU	
• **CS35:**	Single Disc Drive, 400K	**£82**
• **CD35:**	Twin Disc Drives, 800K	**£126**

(P.S. CS35 is supplied in a twin case with a blanking plate to enable easy expansion to a dual drive at a later stage)

Disc Drives in Monitor Stand



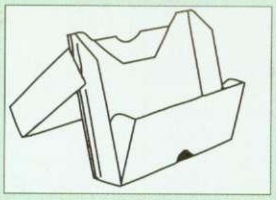
• **CDPM 800S** – Twin 5.25", 800K Double sided 40-80 track switchable disc drives mounted in an attractively finished Beige colour plinth for the BBC B & Master 128K micros. Supplied complete with integral power supply, cables and Utilities disc. The mains switch with neon On/Off light indicator, and the two 40/80 track switches are mounted on the front panel for ease of use.

£165

• **DP35 800** – Same as above except, one disc drive is a 5.25" and the other is 3.5".

£154

Plastic Library Cases



- **DLC1** – Holds 5 x 3.5" Discs. **£1.50**
- **DLC2** – Holds 10 x 3.5" Discs. **£1.90**
- **DLC3** – Holds 5 x 5.25" Discs. **£1.60**
- **DLC4** – Holds 10 x 5.25" Discs. **£2.00**

Disc Albums

Attractively finished in leather-look PVC Vinyl

- **DW1** – Holds 6 x 3.5" Discs **£2.50**
- **DW2** – Holds 6 x 5.25" Discs **£3.00**
- **DW3** – Holds 20 x 5.25" Discs **£3.50**
- **DW4** – Holds 40 x 3.5" Discs or 5.25" Discs **£4.50**

Floppy Head Cleaner Kit

The heads in floppy drives are precision made and very sensitive to dirt. The use of Cleaner Kit is a sensible precaution against losing valuable data. It is recommended to clean the drive head once a week. it is very simple to use. Available in 3.5" & 5.25", please specify.

Price £4

Acorn & Watford DFSs

- Watford sophisticated DFS ROM **£16.00**
- Watford DFS Kit complete **£49.00**
- DFS Manual (comprehensive) **£6.95**
- Acorn DNFS ROM **£17.00**
- Acorn ADFS ROM only **£25.00**
- Acorn 1772 DFS ROM Kit **£49.00**
- Acorn DFS Kit complete **£48**

Watford's MkII 1772

Single/Double Density DFS

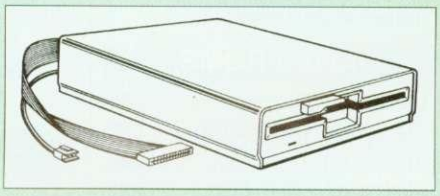
Many of our customers have wanted to use our superior DDFS and Acorn ADFS together. Now our Mk II DDFS Board with its 1772 Disc Controller, has been adapted to allow the use of Acorn ADFS as well. It also has all the commands of the Acorn's 1772 DFS, plus many more added features.

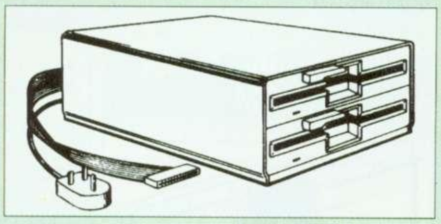
- Complete Kit — Special Price **£44**
- DDFS Manual — (No VAT) **£6.95**
- We will exchange your existing DFS Kit for our sophisticated DDFS for only **£26**

Quality Disc Drives from Watford

All our Disc Drives are Double Sided and will operate in both Single and Double Density modes. All 5.25" Disc Drives are 40/80 track switchable. For ease of use, the switches are front mounted. Follow the trend with a Watford plinth. *(Turn to the 6th page of our advert for the Plinths).*
P.S. All our 5.25" Disc Drives with PSU are compatible with the Compact Micro. All you require is our special Compact Disc Drive cables designed by us.

"Test Bureau Approved for Use in Education"





Our Disc Drives conform to BS415

Type	Description	
	Disc Drive without PSU	
• **CLS400S:**	Single, 40/80 track 400K Double sided Drive	**£70**
• **CLD800S:**	Twin, 40/80 track, 800K Double sided Drives	**£138**
	Disc Drive with PSU	
• **CS400S:**	Single, 40/80 track, 400K Double sided Drive	**£80**
• **CD800S:**	Twin, 40/80 track, 800K Double sided Drives	**£149**

Special Cable to connect both 3.5" and 5.25" Disc Drives simultaneously to the BBC Compact £13

Continued→ → → → → → → → →

Computer Concept's ROMS

Inter BASE	£49
Inter CHART	£25
Inter SHEET	£37
Inter WORD	£36
Mega-3 ROM	£76
Spell Master	£42

Wordwise plus

£40

We are giving away absolutely **FREE,** the superb Word-Aid ROM worth £24, with every WORDWISE PLUS package bought from us.

Word-Aid

This advance utilities ROM extends the power of your Wordwise plus ROM.

- Alphabetical sorting of names and addresses.
- Text transfer options.
- Chapter marker.
- Epson printer codes function key option.
- Search and display in preview mode.
- Embedded command removal.
- Print Multiple copies of a document.
- Multiple file options for print and preview.
- Address finder.
- Label printer.
- Mail-merger.
- Number/delete/renumber.
- Clear test-segment area.
- BBC B, B+ and Master compatible.

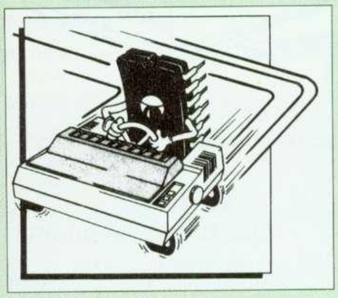
Only **£24**

(N.B. Word Aid requires a Disc interface in your Micro)

Acorn ROMS

View 3.0 ROM	£45
Viewsheet (Acornsoft)	£36
Viewstore	£36
Viewspell – 80T disc	£25
View-Index	£12

View Printer Driver ROM



View is a powerful word processor, but it seriously lacks in terms of printer driver support. With the View Printer Driver ROM, the View users will find themselves in the realms of advanced word processing.

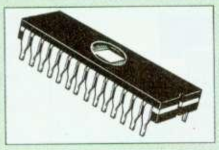
Price: Only £29

Mini Office 2 – Disc

for BBC B & B+	£12
for BBC Master	£14
for BBC Compact	£16

(When ordering please specify for which Micro & 40 or 80T Disc)

Assorted ROMS



ACORN ADFS	£25
ACORN BASIC 2 plus User Guide	£22
ACORN DNFS	£17
Acorn OS B+	£25
Acorn OS 1.2	£14
Beebmon	£22
Dump Out 3	£25
Graphics Extension Rom	
GXR-B	£21
GXR-B+	£22
Logotron LOGO	£43
MASTER OS ROM	£38
Master ULA (47)	£15
Master ULA (60)	£10
Numerator – Archi	£69
Numerator – BBC	£39
Pendown ROM	£32
Rom Manager	£20
SERIAL ULA	£13
TED	£35
Termulator Master	£32
Video ULA	£14
1Mb OS ROM	£39

Watford Electronics' New High Tech Computer Boutique is now open in Luton. Don't miss your chance to visit the Acorn and Watford Villages.

CHIP SHOP

1 MB-10 DIL D-RAM	£4.50
1 MB ZIF D-RAM	£4.00
256K x 4-8 DIP	£4.75
256K x 4-8 ZIF	£4.00

SIMs and SIPs

- 256 x 9-8 £11
- 1Mb x 9-10 £22
- 1Mb x 9-8 £27

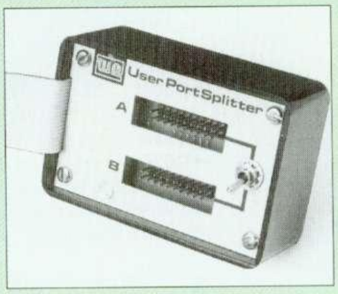
DS3691	£4.50
DS88LS120	£5.25
LM324	£0.45
SN76489	£5.50
SAA5050	£8.75
UPD7002	£6.00
2764-250nS	£3.00
27128A-250n (12V5)	£2.50
27128-250nS (21V)	£4.00
27256-2	£3.00
27512-2	£4.50
27C101G (1 Meg)	£7.00

4013	75p	68B50	£2.95
4020	£1.00	68B54	£7.50
4164-10	£1.55	7438	50p
4464-10	£3.50	74LS00	50p
4816 RAM	£2.00	74LS04	50p
41256-8	£2.00	74LS10	50p
41256-10	£1.50	74LS123	£1.00
6264LP-8K	£4.00	74LS163	£1.00
6502A	£5.00	74LS244	£1.00
65C02 3M	£9.75	74LS245	£1.00
65C12	£9.00	74ALS245	£2.75
6512A	£10.00	74LS373	£1.00
6522	£4.00	74LS393	£1.00
6522A	£5.00	75453	£1.00
62256ALS	£10	75159	£3.00
62256P-12	£8.50	8271	£39
6818	£4.00	9637	£2.00
6845SP	£6.00	ICL7673PA	£3.00

Acorn Speech Synthesizer package complete, for the BBC B Microcomputer

Special Offer £14

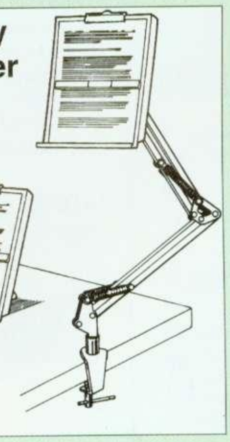
User Port Splitter Unit



Gone are the days when you had to plug and unplug devices from the User Port. This extremely useful little device allows two units to be connected to the User Port simultaneously, and select between them simply by toggling a switch. This device is particularly useful for those people using Quest Mouse and the Watford Video Digitiser or any similar combination

Excellent Value at **£22**

Copy Holder



Whether you want to type in your latest program or the draft of a new trilogy, Watford's manuscript holders are superb for holding your paper at the ideal height and angle to allow you to read and type in ease and comfort.

Available in 2 full A4 versions, desk resting and shelf clamping. Paper is held firmly by means of a plastic retaining ruler and a clip grip.

Desk Top **£8**

Angle poise **£12**

NEW Copy holders as above but with a battery operated, remote controlled cursor/ruler. (By hand or foot pedal.) (Batteries 2 x AA not included.)

Desk Top **£15**

Angle poise **£20**

Credit Card 24 Hour Ansaphone Hot Lines 0582 487777 or 0923 250234/233383

TEX EPROM ERASERS

EPROMs need careful treatment if they are to survive their expected lifetime. Over erasure of EPROMs very rapidly turns them into ROMs!

The TEX erasers operate following the manufacturers specifications to give the maximum possible working life by not erasing too fast.

- **ERASER EB** – Standard version erases up to 16 chips. **£34**
- **ERASER GT** – Deluxe version erases up to 18 chips. Has automatic safety cut-off to switch off the UV lamp when opened. **£36**
- Spare UV tubes. **£12**

ROM Extraction Tool

This extremely useful tool allows you trouble free chip insertion and removal from your computer by distributing the removal force over the whole body of any 24 or 28 pin chip. **£2**

Metal Chip Extractor **£3**

Servisol Foam Cleaner

This king size multipurpose foam cleaner spray is ideal for cleaning Keyboard, Monitor, Disc Drive & Computer furniture surfaces.

£2.50

Antistatic Aerosol Spray

Ideal for cleaning and preventing static build-up on TV/Monitor Screens.

£2.50

Aerosol Dust Spray

Ideal for removing dust & dirt from Keyboard & similar inaccessible spaces. **£3**

OFFICE MASTER

- CASHBOOK • FINAL ACCOUNTS
- MAILIST • EASILEDGER –
- INVOICES & STATEMENT

All this for only **£21** (Disc)

OFFICE MATE

- DATABASE • SPREADSHEET
- BEEBPLOT

Only £10 (Disc)

Spares for BBC Micro

UHF Modulator	£4
Speaker £3; Speaker Grill	£1
Keyswitches	£1
16MHz Crystal	£2
17.734 MHz Crystal	£2
32.768MHz Crystal	£2
Replacement 17 way Flexible Keyboard Connector	£4
BBC Master Power Supply	£59
BBC Master Keyboard	£62
BBC Master Casing	£49

Refurbished BBC B Spares

BBC B Casing	£19
Clear Perspex Keystrip Holder	£3
BBC B Keyboard	£35
BBC B Power Supply	£42

BOOKS (No VAT on Books)

15 Hr Wordprocessing BBC/View	£6.95
15 Hr Wordprocessing BBC/WW & WW+	£6.95
30 Hour BASIC (BBC Micro)	£12.95
1st Word Plus – Mastering	£13.95
1st Word Plus Rel. 2 Manual	£10.00
A3000 Technical Reference Manual	£29.00
Acorn DTP A Guide to	£17.00
Advanced User Guide for BBC	**£10.95**
Archimedes 1st Step – Beginners Guide	£9.95
Archimedes Assembly Language	£14.95
Archimedes Basic V Guide	£9.95
Archimedes BBC Basic Guide	£20
Archimedes DTP Manual	£10.00
Archimedes Operating System	£14.95
Archimedes Risc-Os Programmers Reference Manual	£79.00
Assembly Language Quick Ref.	£21.95
BASIC 2 – User Guide	£2
BBC Micro – Within the	£11.95
BBC B Micro User Guide	£15
BCPL User Guide	£9
Budget DTP on the Archimedes	£12.95
C Big Red Book of	£8.95
C – A Dabhand Guide (Archi)	£14.95
C – A Dabhand Guide to	£14.95
C Programming Lang. 2nd Edition	£24.95
COMAL – Introduction to	£9.50
Deutsch Direkt! (Book only)	£5.95
DISC FILING SYSTEM (DFS) Operating Manual for BBC	£6.95
FORTH on the BBC Micro	£9.95
ISO-PASCAL Reference Manual	£9.95
Master 512 Guide – Dabs Press	£9.95
Master Operating System	£12.95
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ACORN to PC

Stop the Confusion!

Do you have to use both Acorn computers and PC's? Would you like to use your Archimedes or A3000 in PC-emulation mode but are unsure of the new commands?

Although Acorn machines (such as the BBC B, the Master, the Archimedes) are mainly used in education, most commercial computers use other operating systems, particularly MS-DOS. As a result school computer users are at a disadvantage when moving into 'business' computing. PCs and other commercial computers use MS-DOS as the operating system, so commands for formatting, copying, backing up, printing and the modem are not the same. Even file names are written differently! And did you know that there is one Acorn command which, if used in MS-DOS, wipes everything in the current directory?

'ACORN TO PC' enables you to change over painlessly. It shows clearly and quickly how, why and where the two systems (Acorn and MS-DOS) differ. As with a foreign language dictionary, you can use the book to transfer either way – from Acorn to MS-DOS, or from MS-DOS to Acorn.

Price: £9.95 (No VAT)

The Complete BBC Computer User Handbook

If you own a BBC B, B+, Electron, Master 128 or Master Compact, or Archimedes, then this is the book for you. It shows how to get the best from your machine, and how to make it work for you.

Only: **£9.95** (No VAT)

Beeb PC (BASIC)

Designed for program authors to convert BBC programs to run on IBM PCs.

Price: £38

Beeb DOS 3.0

(Now reads Archimedes Discs)

Beeb DOS is a collection of utilities which run on the PCs and enable it to read and write information on BBC Discs.

Price: £39

The Complete Mouse User Guide to BBC Micro

This manual has been written to reveal the secrets of the mouse. It explains all the principles required by the hardware and associated software, and also example listings for inclusion into custom programs. The manual first details the basic principles of the mouse and a simple program which uses these principles. This information should be adequate for most applications. However, it is possible to improve the performance of the mouse by expanding on the principles already used in the software. This is again fully explained and an example program given.

It is possible to gain a full understanding of the mouse from this manual. For those not interested in exactly how the mouse functions, complete example programs are also included.

Price £5.95 (No VAT)

Example programs on Disc £4.95

The Epson RX/FX Printer Commands Revealed Handbook

So you bought yourself a new printer, because the salesman in the shop showed you how clever it is and impressed you with all sorts of printouts to show its capabilities – he may even have offered you a special price.

However, now that you have got it home and connected it to your BBC microcomputer, you are wondering how to make it perform these magical tasks. The manual seems to give no clues, and when you type in the example programs, the computer throws the LPRINT statements back in your face.

Now what do you do, when this £400 piece of high technology refuses even to move its head, and you have stayed up until 2 in the morning with copious supplies of coffee, desperately trying to print something out? Once again, Watford Electronics comes to your help with our new book entitled 'THE EPSON FX-KAGA PRINTER COMMANDS REVEALED'.

This book describes in plain, easy to understand English, how to use and make the most of your KP810, PW1080A or any other Epson FX80 compatible printers like Panasonic KX-P1080/1, etc., with the BBC Micro, both from Basic and Wordwise.

£4.95 (No VAT)

Watford Electronics

Mail Order & Showroom:

Jessa House, Finway, off Dallow Road, Luton, LU1 1TR, England

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BBC

ACORN USER SHOW '92

WEMBLEY EXHIBITION CENTRE
OCTOBER 16TH TO 18TH 1992

OPENING TIMES:
FRIDAY 16TH OCTOBER - 10AM TO 6.00PM
SATURDAY 17TH OCTOBER - 10AM TO 6.00PM
SUNDAY 18TH OCTOBER - 10AM TO 5.00PM

Save money by applying for your tickets today

IT'S AN
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COME AND SEE 'HO
AND SOFTWA'O

QUEST FOR GOLD

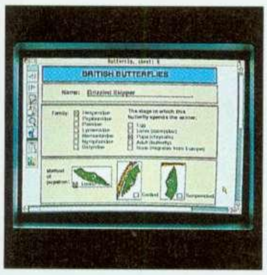
Your chance to play this exciting athletics simulation in a special presentation at the show, with on-the-spot 'coaching' from world-class athletes who have contributed their skills to the game.



Star athletes appearing will include:
Linford Christie
Fatima Whitbread
Colin Jackson
Dalton Grant
John Regis
Steve Brackley
Sally Gunnel and
Yvonne Murray

AN EDUCATION AND BUNDLE OF FUN

E WHOLE WORLD OF ACORN COMPUTING - THE LATEST HARDWARE
WA FOR SCHOOL, HOME AND BUSINESS - ALL UNDER ONE ROOF



EDUCATIONAL ADVICE

A special section for teachers and concerned parents who are looking for helpful advice on all aspects of using Acorn computers in the classroom



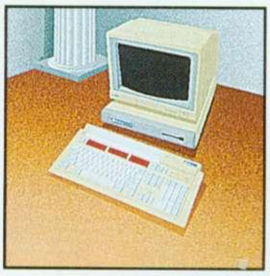
NEW ACORN MACHINES

Visitors to the show will be able to view Acorn's new portable computer, the A4. And with rumours of additional new products from Acorn, the show could be your first chance to see them



MULTIMEDIA APPLICATIONS

With the development of CD-ROM and Acorn Replay, there will be opportunities to view the latest multimedia applications for educational and other uses



NEW SOFTWARE

Education, games, home accounts, business, DTP, graphics....whatever your interests, there is a host of new software packages on show to see and try



GAMES GALORE

As well as Quest for Gold, there will be a host of new and exciting games for you to try at the show. Don't miss your chance to play the latest 'shoot 'em ups' and adventures

WHO'S AT THE SHOW?

- Acorn Computers
- Computer Concepts
- Longman Logotron
- Colton Software
- Risc Developments
- The Fourth Dimension
- 4Mation
- Aleph One
- Minerva Software
- Clares
- Watford Electronics

and over 60 other exhibitors

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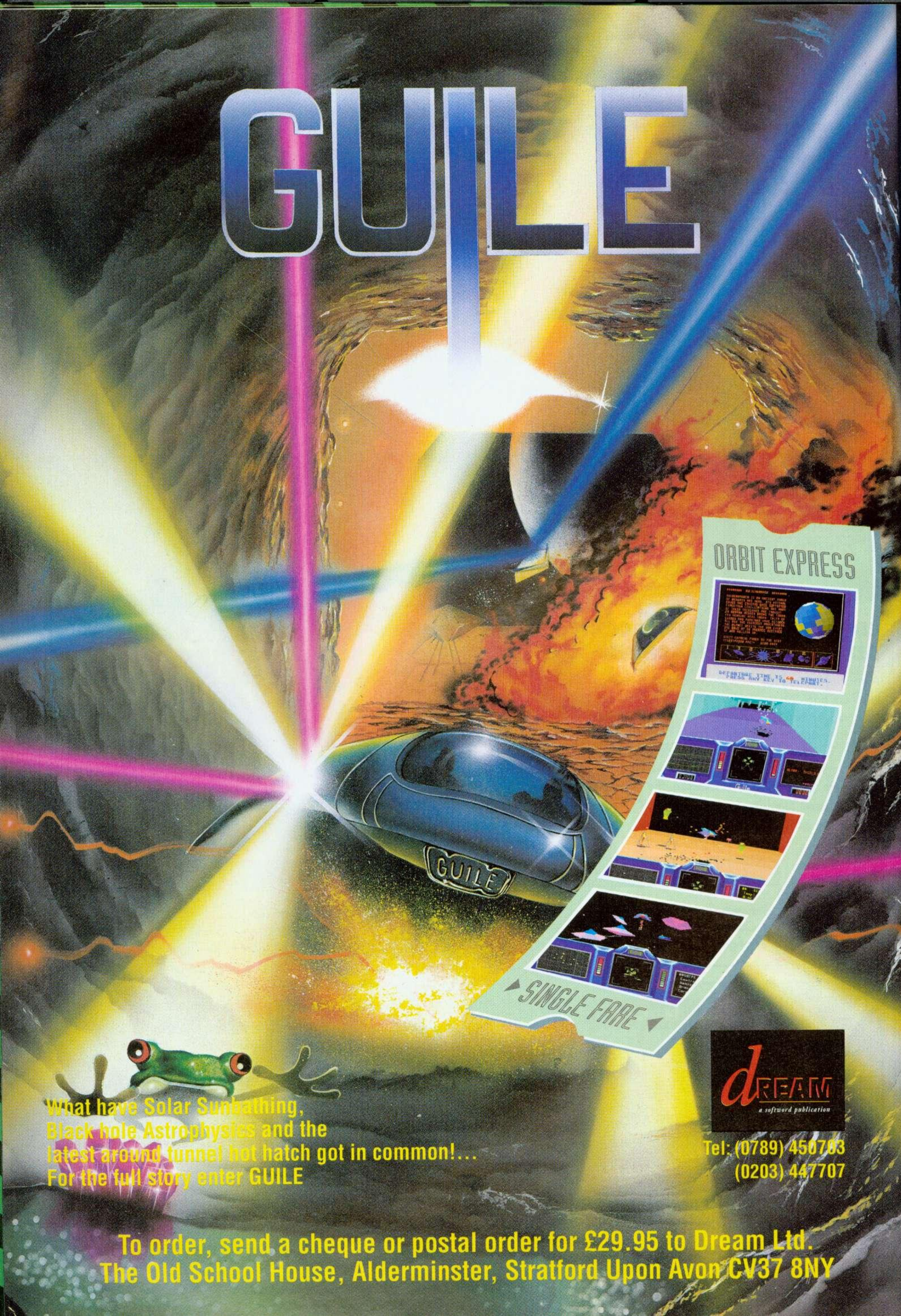
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BBC

ACORN USER SHOW '92

SPECIAL SUPPLEMENT

WEMBLEY EXHIBITION CENTRE

OCTOBER 16TH TO 18TH 1992



NEW RELEASES



OLYMPIC ATHLETES



NEW ACORN MACHINE



THE MAGAZINE

THE VENUE

WELCOME TO THE BBC ACORN USER SHOW

The BBC Acorn User show 1992 kicks off at Wembley in October. Barry Monk introduces some of the highlights

School work, business, word processing, games, desktop publishing – whatever you want to do, you will find something to interest you at the only major consumer show dedicated to Acorn computers.

Whether you currently own an Acorn computer, or are fascinated enough by details of the new range of Acorn machines to want to know more, you can't afford to miss this year's show. It covers the whole exciting world of Acorn, all under one roof.

Sponsored by *BBC Acorn User* and supported by Acorn Computers, this year's show will be bigger and better than ever before, with a host of new products, presentations and the appearance of star celebrities.

The venue will be hall three of the Wembley Conference and Exhibition centre in London, which is larger than the hall used at the same venue last year. Facilities for visitors will include more efficient admittance, with a separate entrance for advance ticket holders (see the coupon on page 54 for advance ticket applications). Additional aisle space will allow give everyone, visitors and exhibitors alike, a lot more elbow room.

Over 70 exhibitors from the Acorn marketplace will be there and many new products, including the latest new range of machines from Acorn, will be seen at the show. Indeed, the show will be a launch pad for many new items of hardware and software for visitors to try as well as see.

Key activity features will include: a special show theatre, running continuous presentations; live demonstrations of the latest *Quest for Gold* athletics simulation, with guest appearances from Olympic medal-winning athletes and a special education section, where teachers, pupils and parents can talk with Acorn about the latest educational products and activities which the company is developing for schools.

Active projects undertaken by the schools themselves will include a motivated team of 'newshounds' who will be producing a *BAU* show newspaper on location.

Look out for the show 'passport' in this issue of *BAU*, and you may win a fabulous holiday or one of several other great prizes.

We hope to see you at the show – you're sure of a great welcome.

GO FOR GOLD



Quest for Gold is the recently-launched Olympic athletics simulation for Acorn 32-bit machines, and it is included as part of the Acorn A3010 package.

The simulation, which allows players to play a variety of track and field events, was put together with the help and advice of top athletes, including Fatima Whitbread. Several star names from the recent Olympics are included in the simulation, including gold medal winners Linford Christie and Sally Gunnell.

Thanks to Acorn's sponsorship of the Chafford Hundred group, an athletics organisation designed to help young athletes, many of the star names who featured in the simulation will be at the show. But they won't just be there to sign autographs – you will be able to see them playing the simulation and you can pitch your skills against theirs. A big screen presentation in the show theatre will bring the full excitement of the *Quest for Gold* to life – and, who knows, you might end up beating an Olympic champion yourself.

IN THE THEATRE

The big-screen theatre, which is sponsored by disc manufacturers TDK, will feature a full programme of free presentations, both live and recorded, throughout the show. Details have yet to be finalised at the time of going to press, but below is a schedule of planned events. We advise you to

check at the theatre upon arrival at the show for further details.

The daily events in brief, are
10.30 to 11.00: Quest for Gold
Your chance to play this exciting athletics simulation
11.00 to 12.20: DTP
Helpful and practical advice on making the most of desktop publishing on Acorn machines
11.30 to 11.55: Games
The latest games for Acorn machines
12.00 to 12.20: Education
Advice and help on using Acorn machines in the classroom
12.30 to 12.50: Quest for Gold
13.00 to 13.20: Acorn
Details of new products from Acorn
13.30 to 13.50: Games
1400 to 1420: TDK
Information on disc making from TDK
1430 to1450: Quest for Gold
1500 to 1520: Questions and Answers
Helpful answers to your problems
1530 to 1550: Games
1600 to 1620: Music
How to make your Acorn machine sing
1630 to 1650: Quest for Gold
1700 to 1720: The Trojan Mouse, a BBC television programme charting 10 years of the BBC micro

SHOW PASSPORT

Want to go on a great free holiday? Then don't forget your passport – the *BBC Acorn User* show passport, that is. In association with Acorn Computers and some of the key exhibitors at the show, we have produced a special show passport which you can use to tour the stands of the show. Your passport will be stamped at appropriate stands and you can then enter a free prize draw to win a family holiday.

You should find a copy of the passport inside this issue of *BBC Acorn User*. But don't worry if you don't – you can pick up a copy when you arrive at the show. Please note that the passport is not an entry ticket to the show.

NEWSHOUNDS

Pupils from St Bede's School in Cambridge will, as they did last year, be producing a special show newsletter, using ESM's *Desktop Folio* DTP package.

This year, the young team hopes to prepare a newsletter the day before the show opens, so that visitors can be given a sneak preview of what will be happening.

The newsletter will be updated every day, so be prepared to see groups of hungry young journalists on the trail of hot news around the show. Visitors to the newshounds' office will be able to see how the newsletter is laid out and printed using the Acorn-based DTP system.

BEST OF ✱INFO

As well as copies of the latest issue and back issues, we also hope to be compiling a *Best of ✱INFO* disc which will feature some of the best programs from our regular programming column. Also planned is a package encompassing our recent series on sound on the Archimedes, which will include issues and discs. Packages will be limited in supply, so be sure to come to our stand early for yours.

TICKET DETAILS

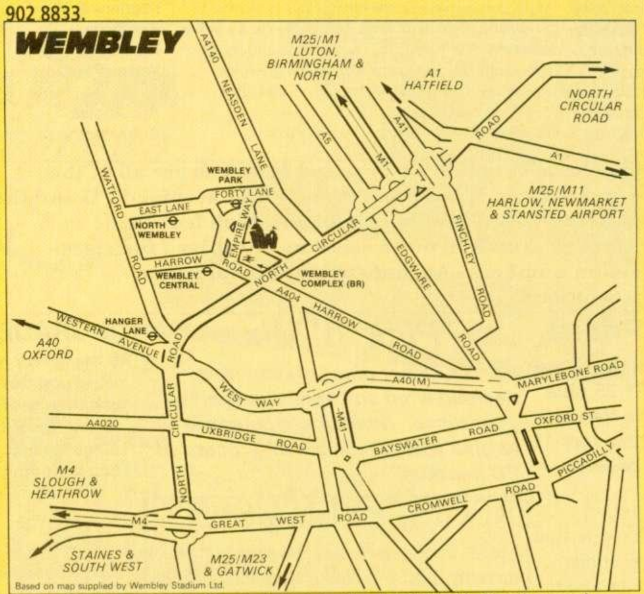
Tickets will be available on each day of the show, but you can save money by applying for your tickets in advance. There will also be a special entrance for those who hold advance tickets. Prices are as follows: Adults: £5 in advance, £6 at the door. Under-16s: £4 in advance, £4.50 at the door. Two adults and two under-16s: £15 in advance, £17 at the door Advance ticket applications can be made using the special order form which can be found on the advertisement on page 54 or credit card orders can be made by calling (0737) 814713.

OPENING TIMES

The show will be open at the following times.
Friday, October 16: open 10am to 6pm
Saturday October 17: open 10am to 6pm
Sunday October 18: open 10am to 5pm
The *BBC Acorn User* show is organised by Safesell Exhibitions Limited, Market House, Cross Road, Tadworth, Surrey KT20 5SR. Tel: (0737) 814084.

GETTING THERE

The BBC Acorn User show will be held in hall 3 of the Wembley Conference and Exhibition Centre, Empire Way, Wembley HA9 0DW. Tel: 081-902 8833.



By road: The centre is situated close to the A406 North Circular road. There is on-site parking for 6,000 cars. Advance ticket holders will receive details of parking locations and costs with their tickets.
By rail: Wembley Stadium station is on the Chiltern line between Marylebone and Banbury. Wembley Central station is on the Euston and Watford line and the Euston and Milton Keynes/Northampton line
By Underground: Wembley Park station is on the Metropolitan and Jubilee lines. Wembley Central station is on the Bakerloo line
By bus: The 83, 224, 226 and 297 provide connections between Wembley Park and Wembley Central station. The 92, 18, 182 and 204 services provide connections between Wembley Central rail station and the no 83 links Wembley Park with the centre. Bus no 18 also provides a service with Marylebone Road and Baker Street.

BBC ACORN USER STAND

The editorial team of BBC Acorn User will be at the show to meet readers and to offer advice and help to both new and experienced Acorn computer users. One key feature will be the Questions and Answers booth, manned by our expert, Richard Garrett. Richard is best known as the regular guru of our Q&A pages and will be pleased to answer readers' questions. Look out, also, for our special *Best of ✱INFO* disc, which will feature many of the best and most exciting programs from our regular programming column.



The BAU team swings into action at last year's show

SHOW HIGHLIGHTS

For Acorn watchers, the BAU show is the most exciting event of the year. Ian Burley gives an insider's view of what to see and where to go

With no less than four new computers from Acorn on show for the first time, plus revisions to the existing machines, this year's *BBC Acorn User Show* is not to be missed for this reason alone.

However, the *BAU* show is also the traditional event for major product releases from the ever growing Acorn software and hardware industry. Our show is *the* place to see what's new, grab some bargains, be impressed by state of the art innovations and meet your fellow enthusiasts. So to make sure you make the most of the show, here are a few of the highlights . . .

Number one in our list of highlights is, of course, the Acorn stand, complete with the new machines. The new A3010 starts at just £499, including VAT, and can plug into your television via a supplied UHF adapter. Despite being cheaper than the A3000 it replaces, the A3010 is 50 per cent faster and has a built-in joystick interface, 1.6Mb floppy drive and the latest version of the Acorn operating system, Risc OS 3.1.

Acorn Risc power has never come cheaper, so look out for the A3010 – it is easy to spot, as it has distinctive green function keys. There should be A3010s in plenty, all doing their stuff at the show, and Acorn promises to stock up with lots for customers to take home with them.

The classroom version of the A3010 is the A3020. It looks the same as a A3010 externally except that the function keys are red, like the old A3000. You won't find a joystick port on this version, instead there's an AUN (Acorn Universal Network) socket for Acorn's new hybrid Econet/Ethernet networking strategy.

Looking like a half-height A5000, the final new Risc-based member of the Acorn family is the A4000, which shares the electronics of the A3020 but in a more professional three-box configuration with a separate keyboard.



The biggest stir this year should be the new A3010

Perhaps the most surprising debutante at the show will be Acorn's new PocketBook computer, a thinly disguised Psion Series 3. However, the disguise is more than just skin-deep – Acorn has reprogrammed the built-in suite of software by adding a spreadsheet and the necessary drivers to enable the PocketBook to conveniently trade files with a more conventional Acorn Risc computer. Once you've played with one of these little beasts it's difficult to let it go!

Don't forget to check out the revised A5000, which now comes with 80Mb and 120Mb hard drive options. Network managers will no doubt want a peek at the new floppy-only A5000, designed just for them.

There's even good news for those of you who are not interested in replacing their Arcs just yet, since Acorn has announced the availability of Risc OS 3.1 upgrades for all Archimedes computers including the original A300 and A400 series.

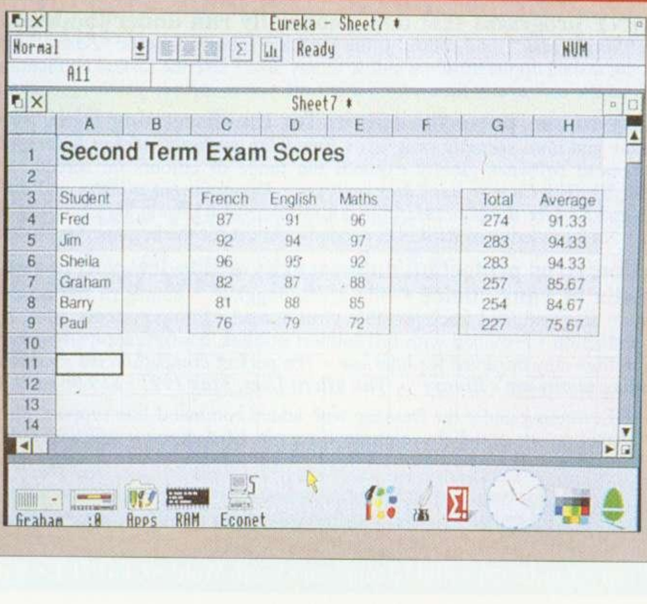
Plenty of dealers should have these for sale, and you can see the latest features of Risc OS 3 demonstrated on Acorn's stand. Usually, all that is required is a change of Rom chips, but early A400 and A300 series computers will

EUREKA!

Most Arc users have been satisfied with the range of spreadsheets available to them, headed by the excellent and flexible *Pipedream* from Colton Software and *Schema* from Clares. However, a third force has entered the fray in the form of *Eureka* from Longman Logotron.

Microsoft *Excel* users should be very much at home with *Eureka* and it will be on the Longman Logotron stand at the show. Longman Logotron will also be offering an update of its *Magpie* multimedia application, and the latest in the *Revelation* series, *Revelation 3*.

Rival Colton, meanwhile, is remaining tightlipped about its latest mystery product.



	A	B	C	D	E	F	G	H
1	Second Term Exam Scores							
2								
3	Student		French	English	Maths		Total	Average
4	Fred		87	91	96		274	91.33
5	Jim		92	94	97		283	94.33
6	Sheila		96	95	92		283	94.33
7	Graham		82	87	88		257	85.67
8	Barry		81	88	85		254	84.67
9	Paul		76	79	72		227	75.67
10								
11								
12								
13								
14								

also require a small carrier board and Acorn does a special kit for these computers. Apparently, Acorn wants everyone to use Risc OS 3 as soon as possible, and the price is set to go up next year, so this could be a good time to make the upgrade.

MULTIMEDIA

Acorn is working hard to establish itself as a leading multimedia platform and *Replay*, Acorn's real time video display system, spearheads this campaign.

No other video window system offers comparable performance to *Replay* at anywhere near the price. *Replay* is being exploited by an increasing number of multimedia software developers and publishers, most commonly in CD-Rom publications.

Acorn also plan to release two DIY *Replay* systems: one for software developers and one for home users. They hope to be showing a prototype for the first time at the show.

For some advice on the array of CD packages around, Cumana is well worth a visit. The company will not have its own stand this year, but has taken space on the Acorn stall. As well as a range of recently released CD-Roms, Cumana will be showing its new user-friendly *Easishare* networking software. Look out, too, for new CD-Rom releases from Dorset-based Spacetech, who market the amazing planetary data system from NASA. Other definites to check out include the Advanced Computer Services stand. They will be sharing their stand with newcomer State Machine and its new enhanced colour graphic cards, offering fast 256 colour high resolution screen modes with an expanded 16.7 million colour palette.

Watford Electronics will no doubt be selling inexpensive Arm3 upgrades, but the main attraction there will probably be the eagerly awaited debut of its PC card.

Rival PC card maker, Aleph One, which is closely linked to Atomwide, is rumoured to be coming up with some exciting enhancements to its product range, and there may be more details at the show.

On this stand you will also find the latest range of Ethernet networking hardware, including the new Acorn A4 card, plus Aleph One's recently announced modular file transfer system *RemoteFS*.

Risc Developments has *Ovation 2* to show off, as well as the latest expanded version of its Desktop *Thesaurus* and the new mouse and keyboard input recorder, *Playback*. Other show-stoppers from Risc Developments should be *Masterfile 3*, the latest database for Risc OS users, and *Spectra*, a new colour scanner.

The Serial Port will no doubt have some very interesting offers on IDE and SCSI hard drives, plus those new 21Mb floptical drives and also look out for an Econet SCSI interface and replacement PC keyboards.

Colton Software is keeping tight-lipped about its stand, but we have been promised a major new product launch at the show and it will be something entirely different from the firm's mainstay until now, the highly successful *Pipedream* spreadsheet-cum-word processor.

The highlight of Ian Copestake Software's stand will be *ColourSep*, a good value colour separation package costing £25 for people who need to produce colour printed output for professional printers. Equivalent packages in the PC world cost as much as 20 times more than this!

Clares Micro Supplies has been fairly quiet for a while, but new products will be in abundance on their stand at the show. These include a new Midi Sequencer called *Serenade*, a Midi drum sequencer called *Rhythm*, a data manipulation and presentation package called *Plot*, and last, but not least, a long-awaited revamp to *Knowledge Organiser*, which is now fully Risc OS compliant.

Naturally we can't include all the highlights from each and every one of the 70 or so stands. Some new products will not be announced until the show opens, so there will still be plenty to discover for yourself. Teachers will find the educational highlights of the show on page 67.

And last but not least, you can meet the *BBC Acorn User* staff on their very own stand in the centre of the show area , . don't forget to come along and say hello!

GAMES

Acorn's new A3010 has already been dubbed the Acorn games machine and, at long last, the quality of games being produced for the Archimedes has reached a consistently high quality. Last year *Elite* for the Archimedes stole the show. Could this year's show-stealer be *Populous*? For some tips on what might be this year's hit, turn to page 178 for our games experts' advice.

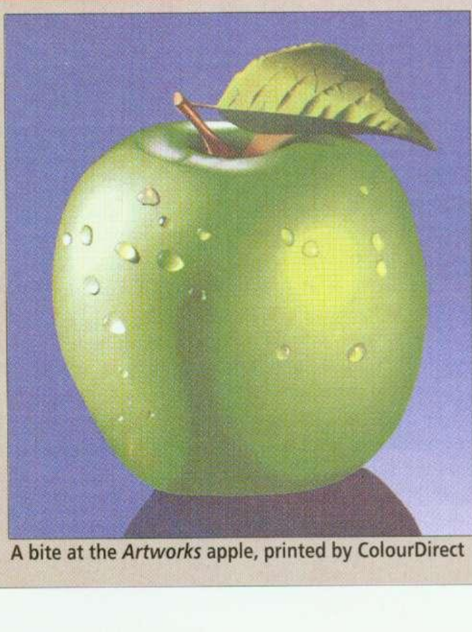


Populous: this year's show-stopper?

COMPUTER CONCEPTS – THE LARGEST STAND

With the biggest stand at the show – even bigger than Acorn's – Computer Concepts has a lot to say at this event. The highlight of Computer Concepts' stand is a demonstration theatre wherevisitors can sit down and enjoy detailed presentations of the company's latest products. Those products will include TurboDrivers for fast ink-jet printer output, the latest version of *Impression*, CC's *Compression* disc filing system for saving disc space and, hopefully, a long awaited rival to Risc Developments' *Thesaurus* utility.

Computer Concepts is also adamant that its extremely ambitious and accomplished *ArtWorks* drawing package will be ready to ship at the show. CC should also be a good bet to see some vivid colour printing courtesy of their ColourDirect printer, ably backed up by the monochrome LaserDirect printer range. Then there's FaxPack and the ScanLight scanner range and a lot more. Wild Vision, which Computer Concepts took a stake in earlier this year, will also be sharing space with CC to exhibit its latest video digitising and genlocking hardware.



A bite at the *Artworks* apple, printed by ColourDirect

THE SHOPPER'S GUIDE

The BAU show is the ideal place to try before you buy, or to pick up a bargain. Ian Burley offers a few hot tips

There's no denying that the *BBC Acorn User* show is usually a bargain hunter's paradise. Many companies offer special discounts and some visitors have saved all year to net a bargain.

But it's quite amazing how fast time flashes by at an event where there is so much to see. So, with time at a premium, it certainly helps to know what to keep an eye out for.

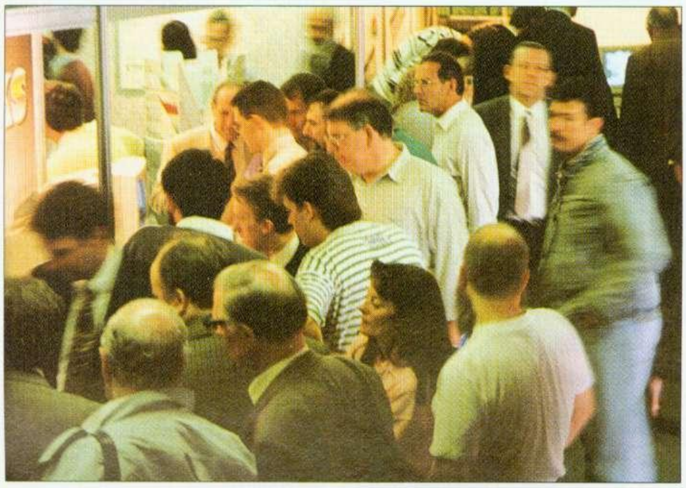
PRINTERS

Think carefully before buying a dot-matrix printer. Unless your budget is extremely tight, or you need to use carbon-copy stationery, a dot-matrix can be slow, noisy and the print quality is often bettered by ink-jet printers which are only slightly more expensive.

As for inkjet printers, Hewlett-Packard's DeskJets are solid and dependable, but rather large. Canon has recently eaten into HP's ink-jet market with its popular BubbleJet range. From around £220 plus VAT, models like the BJ10ex and the newer BJ20 offer portability and print quality nearing that of a laser printer. They are not the fastest printers, especially when printing outline fonts and graphics. but a new TurboDriver from Computer Concepts largely solves this problem. Other good inkjets come from Olivetti and Fujitsu.

For the very best printing quality, you need a laser printer. These have become much more affordable but, once again, the problem of printing Acorn fonts and graphics remains. Even with a laser printer, this can be very slow as a lot of data must be squeezed through the printer interface. If you can afford it, go for a LaserDirect or ArcLaser compatible printer.

These are supplied, with interfaces, by Computer Concepts and Calligraph as well as appointed dealers. The cheapest printers of this type cost about £900, but they give the performance and print quality of printers several times the price.



Bargain hunting was a hectic business at the last BAU show

If high quality colour printing is important to you, take a look at Computer Concepts' ColourDirect, which is based on the Canon BJC800 colour ink-jet. Another colourful newcomer is the Integrex Colourjet Series 2, a compact ink jet which comes complete with a Risc OS driver.

MONITORS

There are two types of monitor for the Arc; the standard resolution type which is limited to a vertical resolution of 256 pixels and the multi-scanning or multisync type. The former is a modified TV tube. Standard screen modes like 12 and 16 can be used with these monitors and most games can run with them.

With a multi-scanning monitor, you can introduce screen modes with more vertical resolution, say mode 20 (512×640 pixels). The maximum resolution offered by multi-scan monitors on the Archimedes is usually either 800×600 or 1152×448 pixels, though special high-resolution monochrome monitors can go as high as 1280×1024.

It's important that if you want to retain the use of standard resolution modes for games, your multi-scanning monitor can scan to as low as about 15KHz. The ideal range is about 15KHz to 39KHz. Some PC multi-scan monitors scan between 30KHz and 60KHz, which is fine for high-resolution modes, but you can say bye-bye to those games!

Don't expect a cheap VGA PC monitor to work without a specially-made lead and, even with one, only a few of the Arc's many screen modes will be compatible. It is advisable to fit a device known as a Vidc Enhancer, since this changes the clock rate of the Arc's video chip to make it compatible with high resolution screen modes.

Check the actual screen quality of the monitor you choose as different makes and models can vary considerably. Some, like Watford Electronics' Aries MC range offer a microprocessor controlled mode memory for preset adjustments, available at the touch of a button.

HARD DISCS

There are three hard disc standards available to Arc users. The oldest and least desirable is ST506. This is fitted as standard to A400 series machines. Most people aspire to either a IDE or SCSI hard disc these days.

The former is cheaper but less versatile than the latter – both are faster and offer larger disc capacities than ST506. If you might one day want to attach another SCSI device or two, like a scanner or CD-Rom drive, go for SCSI. Alternatively, IDE is the standard Acorn has now settled on.

Small 20Mb, or even 40Mb, drives these days are a false economy. They will fill up in no time. 100Mb drives are currently probably the best value.

BITS AND PIECES

Arm3 upgrades are very handy. Arm3 boards are all much the same, so choosing one will usually boil down to the price and size of the board. Personally, I'd go for the smaller surface mount examples from companies such as Watford Electronics or Aleph One. If you're buying a Risc OS 3 upgrade, an Arm3 will boost it noticeably. Prices have fallen dramatically over the last year to around £200.

As for memory upgrades, the story here is much the same as for the Arm3. Prices have fallen and there is plenty of competition. For some users, you just need the basic memory chips. Other computers, like the A3000, will require special daughterboards. You'll find that 4Mb upgrades are on the whole better value than 2Mb ones, while 8Mb upgrades are complex and expensive – but nice to have if you can afford them.

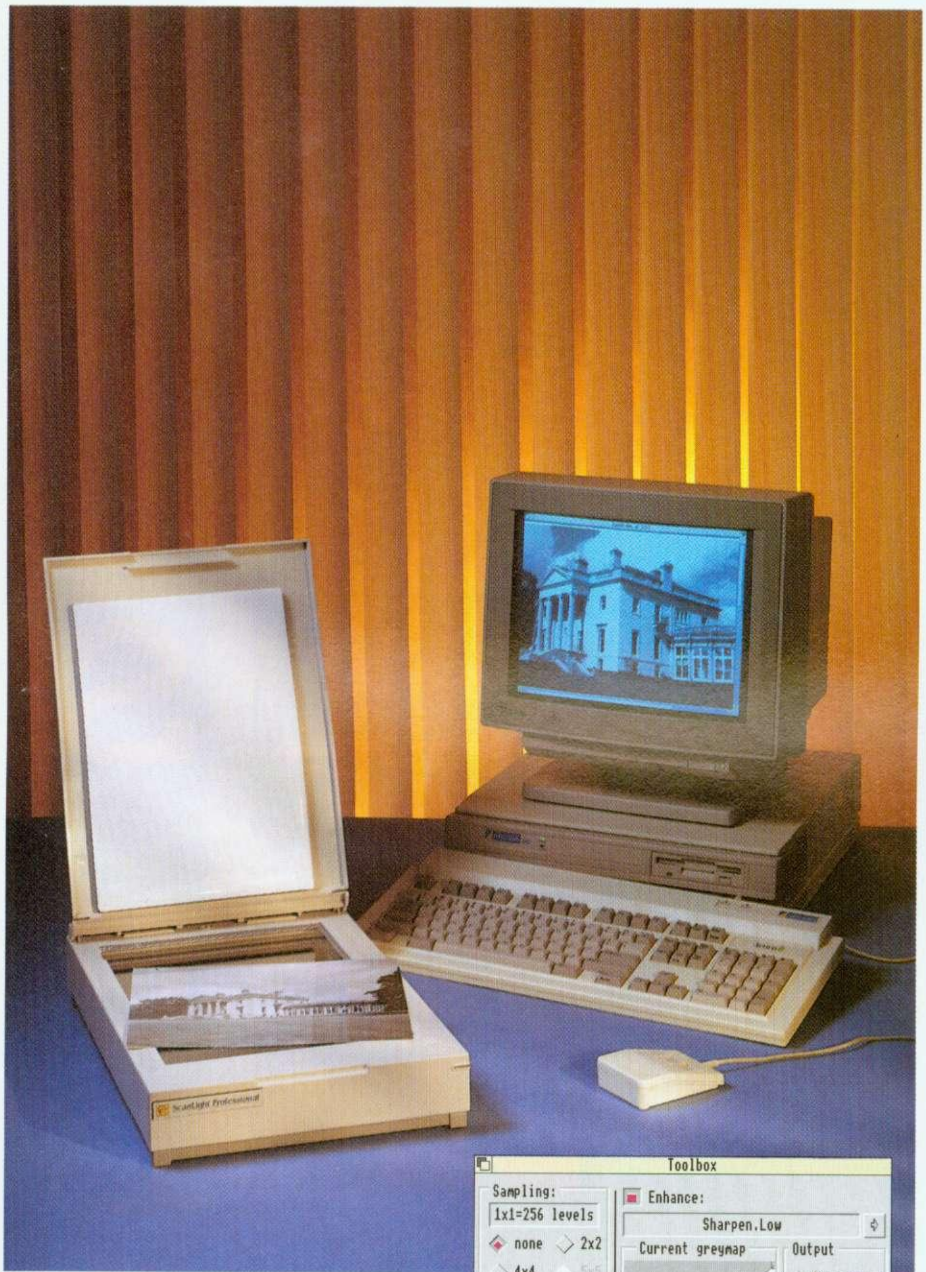
ScanLight

PROFESSIONAL

A new version of the ScanLight Professional, offering improved software, a new, more compact scanner, higher resolutions and a greatly reduced price.

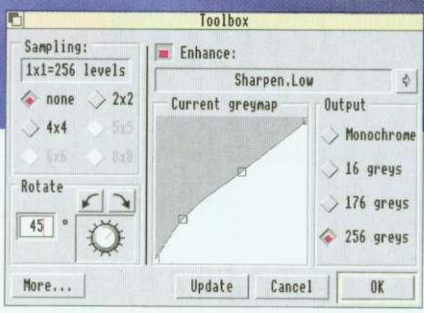
ScanLight Professional is our top of the range flatbed greyscale scanner. It offers up to 600 dpi, A4, 256 grey-level scanning (1200 dpi 16 grey-levels and monochrome) in a device that is not much larger than a sheet of A4. The ScanLight software provides all the facilities required for the most sophisticated image manipulation and enhancement. This scanner can be used for producing 'magazine quality' typeset greyscale pictures. The perfect partner for top end DTP.

The ScanLight range of scanners offers several unique advantages over alternatives. All image manipulation and enhancement can be performed directly on the original scanned image data. It does not need to make more copies of the image, and since 256 grey-level images can be very large indeed this can make the difference between being able to scan what you require and not.



Other ScanLight features include:

- **Continuous on screen dithering to produce the best possible screen image**
- **Simple brightness and contrast controls**
- **More advanced curve based grey-map control**
- **Instantaneous image rotation by any angle**
- **Dozens of image enhancement options such as sharpening**
- **Supports the new RISC OS 256 grey-level sprite format**
- **Scan any selected area of the image**
- **SCSI based scanner compatible with all Acorn compatible SCSI cards, known to work with Oak, Lingenuity, Morley and Acorn SCSI cards**



The main ScanLight control panel, offering various sample sizes, enhancement options, rotation control, and an editable grey-map curve in the centre.

RRP Scanner and software
£595+VAT+ £10 Carriage+VAT (£710.87)
Optional SCSI interface card
£150 +VAT (£176.25)

Compatible with RISC OS 2 and 3. .
4MBytes RAM minimum recommended

Computer Concepts Ltd

GADDESDEN PLACE HEMEL HEMPSTEAD HERTS HP2 6EX TEL.: 0442 63933 FAX.: 0442 231632

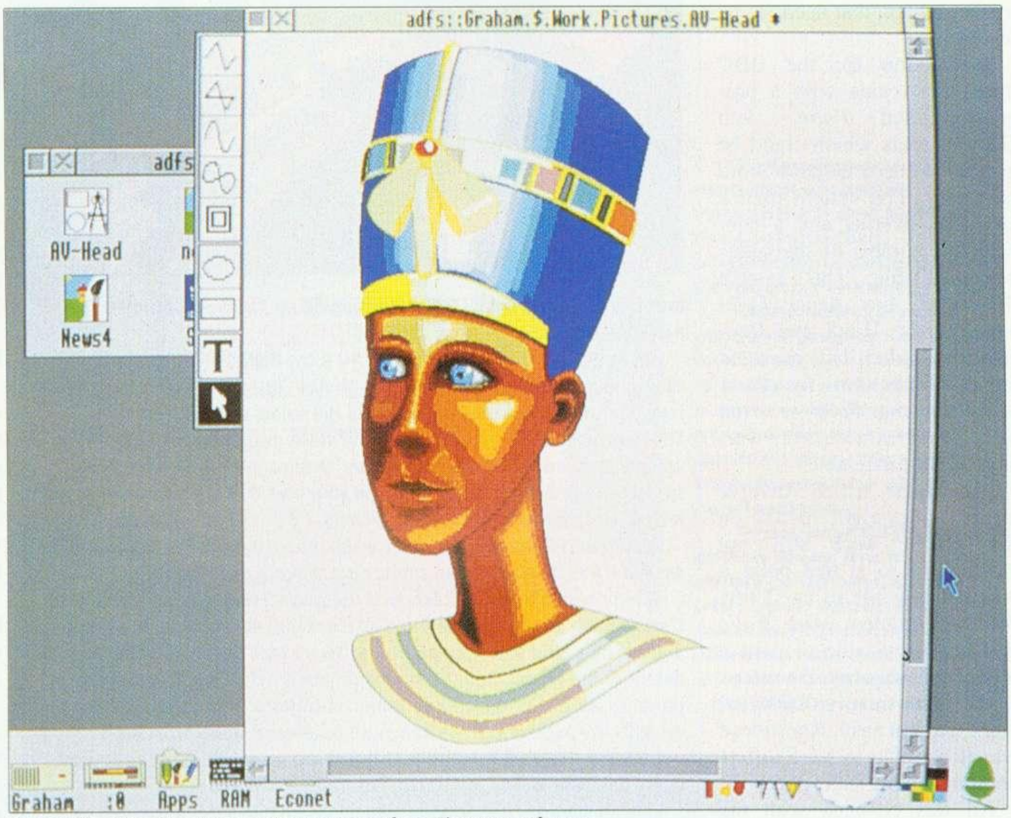
BARCLAY CARD AND ACCESS WELCOME

EDUCATION ON SHOW

The BAU show is vital to education. We asked the experts to see what's on offer

Education is Acorn's bread and butter market and well represented at the show this year. Highlights include the new A3020 computer, which is specifically tailored for the classroom plus the official introduction of Acorn's Universal Networking (AUN) strategy. AUN offers the choice of the powerful Ethernet standard or traditional Econet connectivity, while retaining a common user environment that will be familiar to existing Econet users. The A3020 and its 3-box sibling, the A4000, both have optional support for AUN instead of the consumer A3010's joystick interface.

Acorn has set aside a special stand designed to cater for enquiries and discussion with teachers and parents. Acorn's education staff, including the new head of Acorn's education division, Peter Talbot, will be on hand so if you have any fundamental questions about the use of Acorn computers in the classroom this could be the place to head for.



Part of the educational scene: the Egyptians from Sherston software

EDUCATION SUPPLIES

Longman Logotron will be showing a new version of the *Magpie* multimedia package, now compatible with Acorn's *Relay* motion video system and four new *Landmarks* titles.

There's also a joint effort with BBC Enterprises which has produced *Geordie Racer,* an adventure game for the Arc based on the *Look & Read* BBC School TV series.

Longman Logotron will also feature *PenDown Plus,* the big brother of its popular *PenDown* word processor.

Sherston Software has promised a range of special show prices for its numerous education titles. Here you will be able to see Simon Hosler's *Crystal Rain Forest* and *Arcventure II – The Egyptians*, an archaeological expedition into Egyptian times. Sherston has also developed a new *Help* resource pack for people who need to familiarise themselves with Risc OS 3. Junior educational software for original eight-bit BBC Micros will also be shown.

Storm Educational Software will have a special feature on its stand at the show – a program to chart the progress of the British Steel Challenge 28,000-mile yacht race. The role-playing program is called Round the World Yacht Race and lets children plan and calculate the passage of a boat from Southampton to Rio de Janeiro and on to Tasmania, Cape Town and then back to Southampton.

Triple 'R' Education, in association with The Fourth Dimension, will be showing its *10 out of 10* series of subject-based educational software packages. The series spans the age range from Junior to GCSE level. Unique to the *10 out of 10* series is a continuous automatically updated log of a particular student's progress. Up to 64 children can be involved at a time.

Pen and Think is a newcomer to the Acorn fold and the family-run company's two programmers are the sixth-form sons of the proprietor, Bill Leedham. Mr Leedham is a former head of a county learning resources service and he is now lending his expertise in the field to anybody who he can help. *Pen & Think* can provide software, ideas and design for a variety of applications including audio-visual presentations, worksheets, guide books, as well as a comprehensive DTP service based around *Impression 2*.

Cambridgeshire Software House will be showing its Colourmaster Imaging System, based on the latest hi-band Canon Ion Professional still video camera. There is an open invitation to have your picture taken. Also on the stand will be demos of the cross-curricular humanities simulation *Frontier 2000*, including a new CD-Rom version and the *Gemini* compendium of learning games.

Another interesting educational game will be debuted at the show from Gwynedd-based Wyddfa Software. *Talking Pictures* is described as a colouring book which can talk. We never had things like this when I was at school – which wasn't *that* long ago!

Ian Burley

In addition to the stands there is a large area for education projects. The exhibitions were developed in schools and are run by pupils from around the country – for a full program, visit the model classroom in the education area. Meanwhile to give you a taste, we asked three schools to tell us about their projects . . .

COMMUNITY TALK

In schools where many pupils do not have English as a first language there is always a need for word processors in other languages. This is not always easy – but if community languages are to be given their true place in schools then it is a problem that needs to be resolved.

A solution for the BBC micro first came with a program called *Folio*, with Gujarati fonts which could be used to set up a Gujarati word processor. The system used a keyboard overlay and a considerable number of characters was available. This system developed into Asian *Folio* and Punjabi, Hindi and Bengali were added. This provided an excellent start for those schools using *Folio* – even more so when a network version became available.

Languages which involve writing from right to left on the screen were still not catered for so at that point it was not possible to use Urdu. Another problem with *Folio* was not being able to have a mix of languages on the screen at the same time, so bilingual work was not easy. Nor indeed was it possible to have different fonts on the same page.

All this changed with the advent of the Archimedes and, at Alperton, a project was started to see how community languages could be used in IT. The progress which we have made to date will be demonstrated at the *BAU* show.

The Electronic Font Foundry (EFF) produced a series of fonts that included all of the above. The way that the Archimedes uses fonts allows the Gujarati font, for example, to be loaded in the same way as any other font, so paving the way for single language document processing or straight forward bilingual work. If necessary the community languages can be placed side by side with English, or indeed any other language.

Asian fonts such as Gujarati require a keyboard driver to allow access to the full range of accented and half characters – many languages have far more characters than English. EFF produces keyboard drivers not only for their community language fonts but also for some European languages. Instead of a keyboard overlay, EFF produces keyboard maps which sit beside or behind the key board. This is not as problematic as it may seem. The Gujarati characters are allocated to their nearest phonetic equivalent so, if there is a soft and a hard 'T' in Gujarati, then they will be allocated to the 'T' key on the standard board. It is our experience at Alperton that the students soon find their way around the keyboard and, at the show, they will be able to demonstrate this fact.

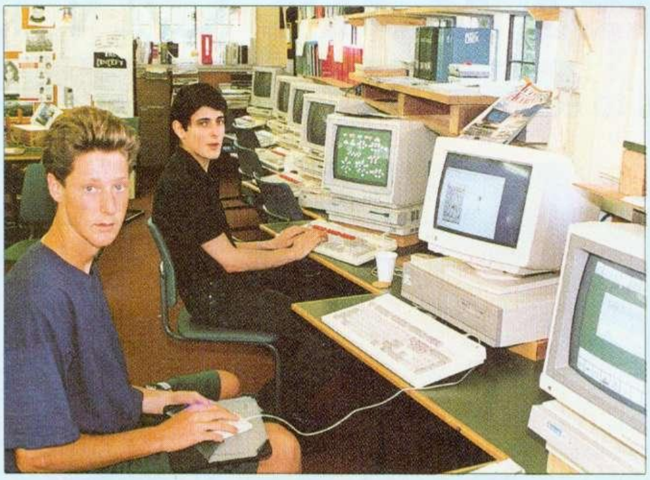
Phases 2 is also to be demonstrated at the show: a program that allows young children to do work in a variety of languages. For students arriving in this country with no knowledge of English, but able to read Tamil, for example, the Arc offers them a form of communication, and a chance to learn valuable IT skills, without the need for a translator by their side.

At the show, students will demonstrate how *Phases 2* can be used to produce documents in their community language or to produce bilingual teaching materials. This is also true of *Pipedream 4* because it now allows rows of various heights in its documents.

We have produced work in *Pipedream 4* and *Desktop Folio,* and while our demonstrations will be with *Phases* we hope to have work from other programs to show.

Stuart Smith
Alperton High School

SCHOOL SUCCESS



North London school, Mill Hill, will be providing a number of projects to entertain the public.

We've all seen clip art, but at the *BAU* show there will be a unique chance to get hold of some some 'clip photos'. Bring along your friends and family to the videosnaps stand and Mill Hill school will do the rest.
The videosnaps stall is set up to transfer video images on to the screen so, when you approve of the screen picture, the image is saved onto disc as a spritefile.Take it home and drop it into your own DTP packageto use in letters. birthday cards, personal stationery, CV's – the list is endless.

A printout service will also be available. There is a small charge, which is smaller if you have your own empty disc: all profit goes to charity.

Also provided by Mill Hill School is the *Product Locator*: a database of all the products. all the exhibitors and all the stands at the show. It is set up and run by a local school, using new software each year. Simply key in details of the product sought and the output is a choice of directions or a printed map. In 1991 *Magpie* by Longman-Logotron was used and the results were excellent. There was much positive feedback from both visitors and the pupil-exhibitors. This year the new version of the *Squirrel* query database will be put through its paces. Come and try it!

Late on Saturday and Sunday, two pupils from Mill Hill school will be showing off their own education software programs. The two packages were written in an attempt to prove that Basic 5 can be used to produce high quality software. Simon had very little programming know-how before he started his project, but in a few months he knew enough to write a talking circuit designer.

The second program was written by Nicholas Mailer who began his *Molecule Poster* package as an early GCSE project. Nicholas was so fed up with the SYS commands during this time, that he developed his own windowing system in Basic.

Bruce Dixon
Mill Hill School

EXIT POLL

If, during your tour of the *BAU* show, you bump into a team of keen students who insist on asking you lots of questions, then you have been chosen to take part in the Exit Poll, a project run by Oakland school. It's a survey, designed and carried out by a team of GCSE business studies students.

To carry out the survey, students have designed their own questionnaire to collect data from visitors. Among the topics that the questions cover are: which part of the country the visitors travel from; how they rate the show and the venue; whether they own a home computer; what use they make of it; and what their interests in computing are.

As there will be an expected audience of 10,000 over the three-day period, the research teams hope to interview roughly 150 individuals a day and input the data into BBC computers. Both questionnaire and database will be constructed at school using *View* and *Inform* on Master 128 computers. *Graphmaker* will also play a part in the proceedings – throughout the day the information will be displayed graphically to provide ongoing statistical information.

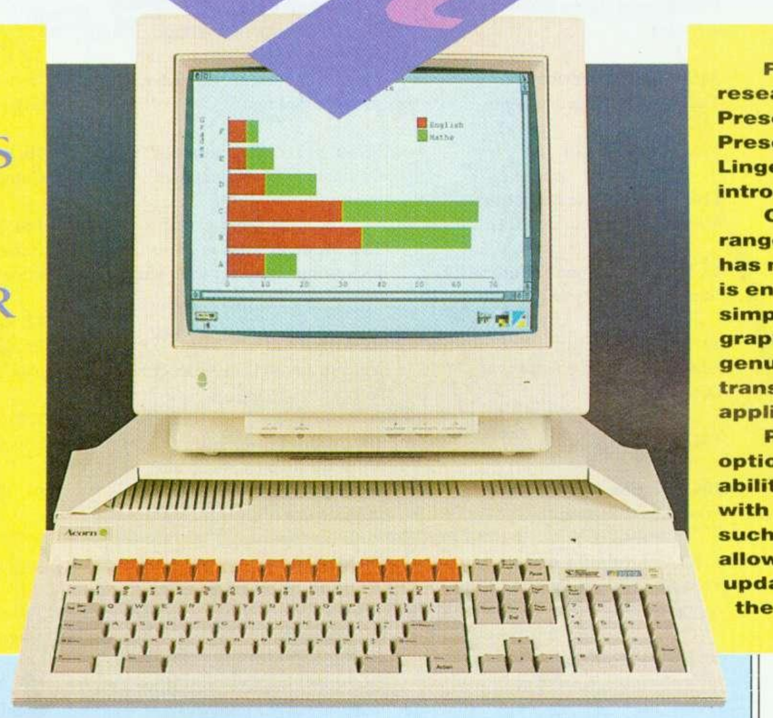
Back at school, during business studies lessons, the students will be looking at market research in business, the many ways in which to conduct market research, how to choose samples and construct a questionnaire.

We will also look at collating the results and how to organise and present them in a logical manner. Thus the entire project is directly relevant to the business studies syllabus, and also meets many Attainment Targets for Design and Technology.

Terri Chandler
Oakwood School, Horley

presenter gTi

THE PRINCIPLES OF PRESENTER TAKEN TO NEW HEIGHTS



Following extensive research amongst Presenter II and Hotlink Presenter users, Lingenuity is delighted to introduce Presenter GTi.

Generating a vast range of graphs and charts has never been easier. Data is entered and edited via a simple worksheet, and all graphs can be saved as genuine draw files and/or transferred into other applications.

Presenter GTi's Hotlink option gives the user the ability to communicate with other applications such as Pipedream 3 - allowing relevant data to be updated continuously for the displayed graph.

EXISTING PRESENTER FEATURES:

- Bar, Line & Pie charts
- 3-Dimensional displays
- Auto scaling
- Fast Hotlink transfer
- User definable layouts
- Full colour or monochrome graphs
- Supports CSV file format for loading and saving data

NEW GTi FEATURES:

- Multiple Pie chart display
- Logarithmic axis scaling
- Regression line (Line-of-Best-Fit) data available: Constant, Gradient, t ratio, Residual value, R^2
- Function key short cuts
- Zoom option for graph display
- Multiple document capability
- Multiple view option
  - File Information box
  - Instant display of saved graphs

ENHANCED GTi FEATURES:

Wider range of Graph types:-
- 8 different types of Bar charts
- 4 different types of Line charts
- 3 different types of Pie charts
- Scattergrams
- 2 different types of area chart

- Dynamic worksheet area.
- Comprehensive file information
- Auto Label/Data detection
- Easier-to-use data entry window
- Increased display options for all graphs
- Faster draw and screen update routines
- Grids available for all graphs
- Data point symbols - selectable
- Line patterns - selectable

Presenter GTi conforms fully to RISC OS guidelines **and has been designed to be part of your essential productivity tool software library.**

PRESENTER GTi - £69.95
(UPGRADE FROM PRESENTER - £30)

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STAND BY STAND

Centre: Acorn Computers
The public debut for the new A3010, A3020, A4000, PocketBook computers and Risc Os 3.1 upgrades
Centre: Redwood Publishing
BBC Acorn User itself, plus sister magazine Educational Computing
(Stand information correct at time of going to press)

26. Ace Computing
Best known for the 3D drawing and animation package, Euclid, plus colour printer drivers

73. Advanced Computer Services.
New colour graphics cards plus networking and accounting products

64. Aleph One
Combining with Atomwide – Ethernet and Archimedes PC cards, Arm3 and Ram upgrades, RemoteFS, plus a lot more

81. Apricote Studios
Risc OS Prophet accounting software

91. Archimedes World

132. Arm Club

78. AVP
Educational software

20. Beebug Ltd
Also Risc Developments – Masterfile III database launch. Ovation 2 DTP, IDE disc drives, Thesaurus.

81. Birdtech

56. Calligraph Ltd
ArcLaser direct drive laser printers

32. Cambridge International Software
Games galore

42. Cambridge Software House

110. CJE Micros
Computer accessories, including home grown Ram and Arm3 upgrades

74/76. Clares Micro Supplies
Schema, Render Bender and Titler plus newcomers like Knowledge Organiser 2 and more

16. Colton Software
Pipedream 4 and something new . . .

1/3/5/7/12/14. Computer Concepts
The show's biggest stand. From Impression and Artworks to LaserDirect, scanners and fax cards

138. DD International
PC Emulator software – featuring the US version of Autoroute

88. Desktop Projects
Full range of Acorn hardware and software

34/36. Digital Services
The Squirrel database system

126/127. Dyad Ltd

116. Electromusic Research
Music making midi expertise

43. Electronic Font Foundry (EFF)
Need a font? They've probably got it

60. ESM
Education software – home of Destop Folio

134. Explan UK Ltd

106. 4Mation
Educational Software

121/122. Ground Control
Teletext adaptors, Ram and Arm3 upgrades.

30. HS Software
Junior Education software

18. Ian Copestake
Software galore plus specialities; ColourSep colour separation software and IDE hard drives

44. Icon Technology
EasiWriter and TechWriter word processing software.

65. Ifel
Ram upgrade specialists.

104. Integrex Systems
Colour printing solutions.

86. Iota
Junior education software.

56. Irlam Instruments

57. Kendal Computer Centre
Arcounts and Payroll business management software.

112. Klein Computer
Showing what the Archimedes has achieved in Germany

94/96/98 Krisalis Software
Games, games games

9. Leading Edge
Hardware and software add ons developed by Vertical Twist

22. Lindis International
Acorn's export agent. New products include CADmust and TouchWindow

11. Longman Logotron
New Eureka spreadsheet, originators of PenDown, Replay version of Magpie multimedia and database package PinPoint

38/40. M D Office Supplies
Computer consumables and accessories

124. Mewsoft
Interesting utility software plus a diet manager program

28. Micro Aid
Veteran Acorn firm, productivity software and supplies

100. Micro Power Ltd
Software supplier which also develops its own range of Archimedes games

50. Millipede
Apex video graphic boards.

66. Minerva
Prolific software house. Debuting Easiword Plus, Desktop Office 2 and some new CAD packages

48. Morley Electronics
SCSI hard disc controllers and other hardware add-ons

24. Norwich Computer Services
Publisher of Archive newsletter and supplier of all things Archimedes

71/72. Oregan Software Developments
Archivist database and Symphony multi-track sound editor.

82. Orion Computers
West Midlands Acorn dealer

136. Palette Studio

111. Paratex
A company with a few Archimedes surprises from Germany.

113. Pen and Think
Painter Plus art program for beginners plus a home and school database called Data Plus

46. P.R.E.S.
Archimedes add-ons like A3000 workstations.

89. Resource
Education software

84. Sherston Software
Education software.

21. Simis Ltd
Simulation software specialists, authors of Clares Interdictor

54. S J Research
Networking solutions for schools – will be showing NEXUS.

70. Snap Computer Supplies
Computer bits and pieces.

140. Software 42
Games, utility software and clip art. Ixion 3D vector game debut

52. Spacetech
Exploring the heavens on CD-Rom, plus general celestial computing

120. Storm Educational Software
Education software

83. Techsoft UK Ltd
CAD/CAM specialists. Will debut 3D object viewer with stereoscopic option

Theatre: TDK UK Ltd
Magnetic media suppliers

103. The Data Store
Highly regarded Acorn dealer from Kent

68. The Fourth Dimension
Possibly the most prolific Acorn games software house

62. The Serial Port
Cheap hard drives, BBS and comms software, Floptical drives, replacement keyboards, and so on

80. Topologika
Educational adventure games

114. Turcan Research Systems Ltd
Wargame simulations specialist

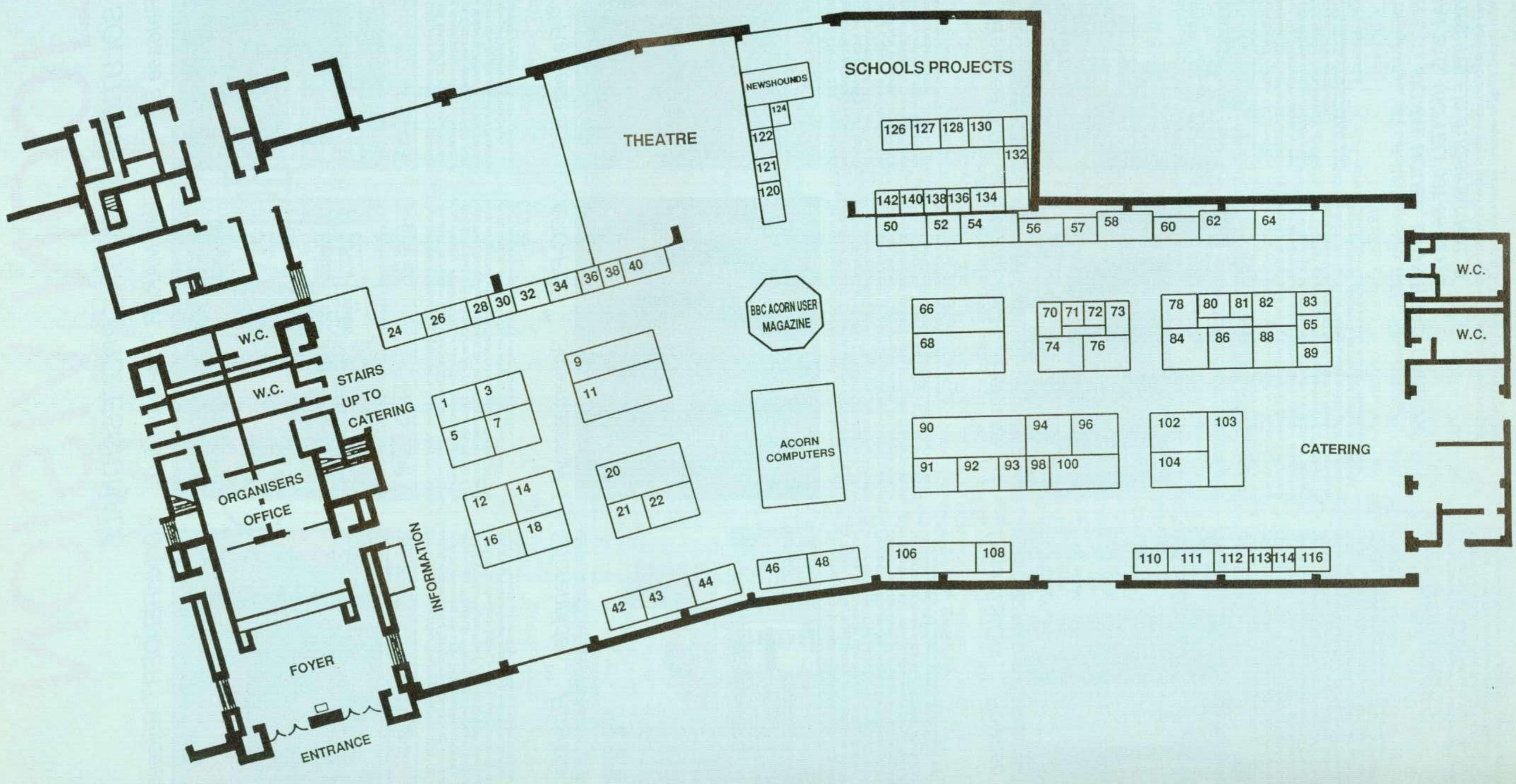
108. Videk Ltd
Cables, connectors, printer sharers, and so on

90/93. Watford Electronics
You name it – they will probably have it. Specialities include Arm3 upgrades for A3000s, new PC card should debut

58. WeServe
Printers, listing paper, discs and all those other vital things

142. Wyddfa Software
Language development software and special fonts for youngsters

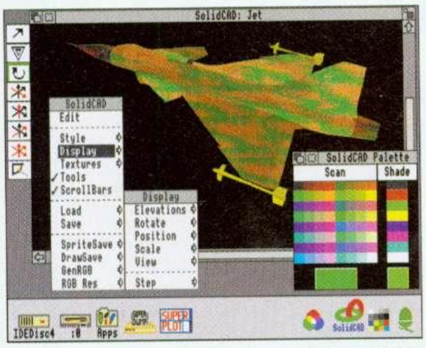
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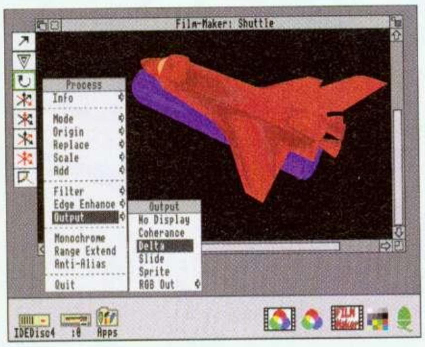


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"the fastest ray-tracer...outputting the highest quality images" - Archimedes World.

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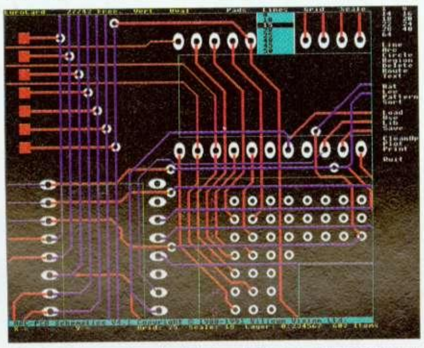


The first fully integrated environment for 3D CAD, Photo-realistic Rendering, Interactive animation, Texture mapping, Programmable animation, 24 bit RGB output and high resolution hardcopy to printers and plotters. The system provides 3D CAD facilities for Architectural, Engineering, Interior design and Teaching CDT using the industry standard 3rd Angle projection for drawing in Elevations. The package includes SolidCAD®, FilmMAKER®, and SolidsRENDER® offering a turnkey solution satisfying all your conceptual design, and presentation requirements.

"Puts Silicon Vision at the Top of the CAD market" - Archimedes World.

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ARC-PCB ™ Schematics v4.1

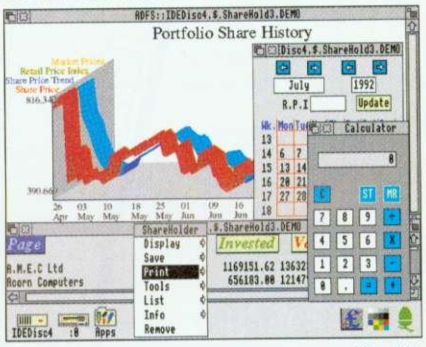


The most comprehensive Electronic Design Automation tools available for RISC OS. The range starts at ARC-PCB v1.7 for purely Digital PCB layout, graduating to ARC-PCB Professional v3.1 for combined Analogue/Digital PCB layout and ultimately to ARC-PCB Schematics v4.1 providing both Circuit Schematic drawing and all PCB layout features in one design interface. All versions include, Automatic Routing, Multiple layers, Component pulling, On-line Help, Drivers for Printers & Plotters, and up to 300,000 components. GerberPLOT & ExcellonDRILL options are £75 each.

"Performs up to professional standards." - BBC Acorn User.

£125 *(v1.7)*, £275 *(v3.1)*, £375 *(v4.1)*

Shareholder ™ Release 3.0

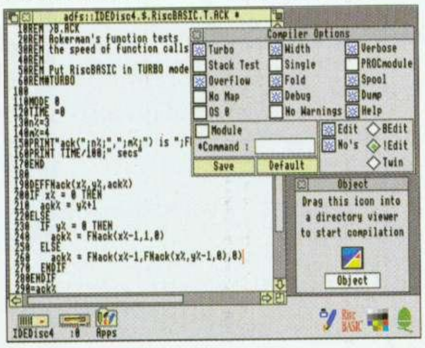


The complete share holder management systems providing all the facilities needed to automate your portfolio available in two versions. ShareHolder v2.0 features include Company statistics, Share holdings, Transaction processing, Portfolio history, Forecasts, Dividends due, Share price updates, built-in Calculator, Calendar and Hardcopy facilities for total integration. ShareHolder Professional v3.0 also includes Share trends, Retail Price index, General Market Prices and links to CEEFAX, ORACLE & PRESTEL.

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£125 *(v2.0)*, £275 *(v3.0)*

RiscBASIC ™ Release 3.0



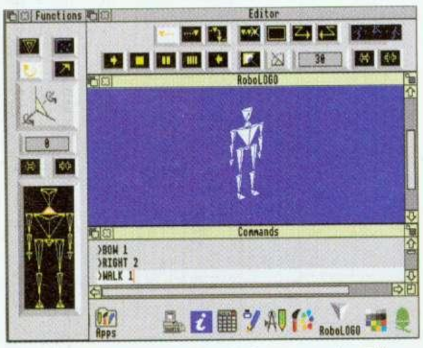
The complete software development system for producing sophisticated RISC OS applications. The unrivalled RiscBASIC compiler allows you to use the interactive development environment of interpreted BASIC for fast prototyping and interactive testing followed by source code security and the fastest machine code performance of final compilation.

"If you are looking for THE compiler to go for, and are confused about which one deserves to win the very public battle that has been raging in the advertisements, well my preference is for RiscBASIC" - RISC USER.

"Produced significantly more efficient code" - Acorn Computing

£99.95

RoboLOGO ™ Release 1.1

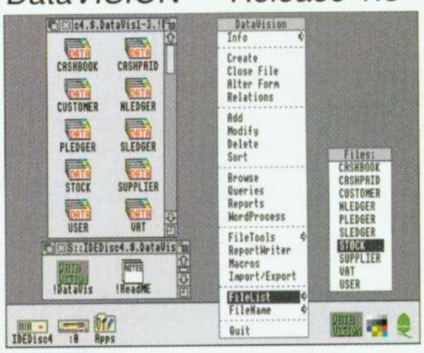


RoboLOGO provides the ideal introduction to computing. This new extension to traditional LOGO provides three dimensional control of an articulated humanoid or animal figure based on the standard LOGO language. Natural commands such as 'Walking', 'Bowing', and 'Picking', etc are automatically represented graphically by natural movements of the 3D figure which is readily understood by students. The traditional Turtlegraphics and 3D Glider features are also supported for students to explore their school work further.

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DataVISION ™ Release 1.3



The only true relational database management system available for RISC OS. Capable of performing relational updating of databases as well as the usual relational reporting features. This is all possible without resorting to programming. For advanced users a reports programming language is provided. Also includes Wordprocessing, Mailmerging, Label printing, Reports, Queries, Formula entry and Validation. Built-in security measures stop multi-tasking during relational database operations to maintain database integrity in the event of other programs crashing. Includes an accounting example to highlight DataVISION's power.

"DataVision is a good, solid relational database" - Computer Shopper.

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FASTER FOOTWORK

The Arc is speedy, but are you as fast? Paul James maps out some short cuts

The Arc is an amazing personal productivity tool. But, like any tool, it can take a while to work out the best way to use it. So what can you do to speed yourself up, as you work?

Aside from software, getting a hard disc is the greatest step-up in productivity that you can take, as long as you organise it correctly. More memory is also a must – for speedy work you need at least 2Mb, if not 4Mb, but what about an Arm3? Well, the best advice here is that if you can survive without one, then make sure that you never go near an Arm3 machine. Once experienced, never forgotten!

But there are ways to speed up your work without going out and spending lots of extra cash. For instance, if you're really stuck with a single floppy drive, then you must organise your discs carefully. Keep one disc for fonts and one disc for your System directory. Applications discs and work discs must all be labelled carefully.

An index system is something that even the most organised user will not find easy to keep up to date, but giving useful names to each floppy will help things tremendously. Getting the message that says: 'Please insert Disc 14_05_Tue' is not very helpful, but if your computer asks you to insert disc *WorkDisc1*, and you have a disc clearly labelled *WorkDisc1* you'll find things run far more smoothly. Get into the habit of naming each disc properly and organisation from the beginning will improve things tenfold.

Reading fonts from a floppy disc is a slow process. There are two ways around this, both of which require extra memory. You can either make your font cache large (say about 440K), or you can copy your fonts into the Ram disc, and have a small font cache of about 60K. The latter method is the better, and will remove the need to keep on replacing your fonts disc when the computer needs to display a new font on screen.

Of course, if your font directory is on a hard disc you won't need to put it in Ram, so just create a reasonable sized font cache, of about 70K for two families of fonts, or about 224K if you're using lots of families and sizes.

What else is going to slow you down on your computer? Well, if you're using *Draw* then a complex picture may take a while to re-draw. If you do something else, with that complex drawing on the screen then, every time you wipe a menu, or move a window across it, it will take time to re-draw. Windows that take time to re-draw, should be made them as small as possible when you're not using them. Perhaps you can then hide them behind another window that won't move.

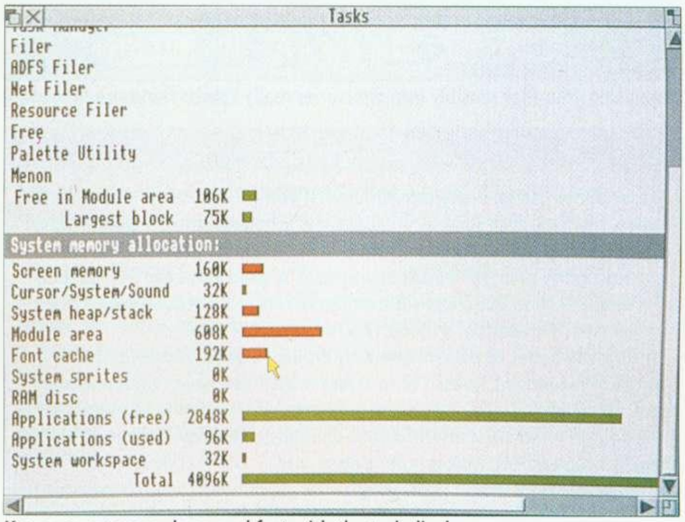
Also, you may be drawing a picture with lots of lines of different widths. *Draw* is quite slow at rendering this type of picture, so try and use thin lines to sketch it out, and make them thicker later on.

Little things can slow you down, too. How many times have you tried to pick up a small object in *Draw*, or a thin frame when using *Impression*? What you may not have realised is that if your mouse has a speed of about four or more then it will skip alternate pixels, meaning it misses out bits of the screen as it moves. This can be solved by temporarily giving the mouse pointer a step of one or two. This means that your pointer visits every pixel, and won't miss any out.

THE ADJUST BUTTON

Aside from hardware upgrades and configuration options, there is one very important button on the Archimedes. Don't go looking for it around the back of the computer, for it's under your ring finger (if you're right-handed). This Adjust button (the right hand button of the mouse), can be used in all kinds of places as a time-saver.

For instance, used on the close icon of a directory viewer, it closes that window, but opens the directory on the



Keep your memory keen and fast with the task display

CREATING A RAM-BASED FONTS SYSTEM

You'll need at least 2Mb in your machine to do this. First of all, take your fonts disc and find out how large the font directory is, by pressing Menu over it and choosing Count. To find out exactly how many kilobytes this is, divide it by 1024. This is the size of the Ram disc you will need to create, plus 10K or so more for luck. To create a Ram disc, press Menu over the task icon (the A or Acorn in the bottom right of the screen) and choose Task Display. Using the scroll bars find the Ram Disc bar and, using Select, drag the bar out to the right. Keep dragging until the disc is the size it needs to be and then let go. Now make the Font Cache about 60K then close the task manager display.

Click on the black Ram disc icon on the icon bar, and a directory viewer should appear. Now drag the Fonts directory from your floppy onto the Ram disc viewer. When it has finished copying, double click on the Fonts directory in the Ram disc, and close all windows. Then dismount the floppy and remove it. You won't need that floppy again, as all of the fonts information is read from the Ram disc, and since the data is already in the computer's memory you'll find that your fonts fairly zip onto the screen.

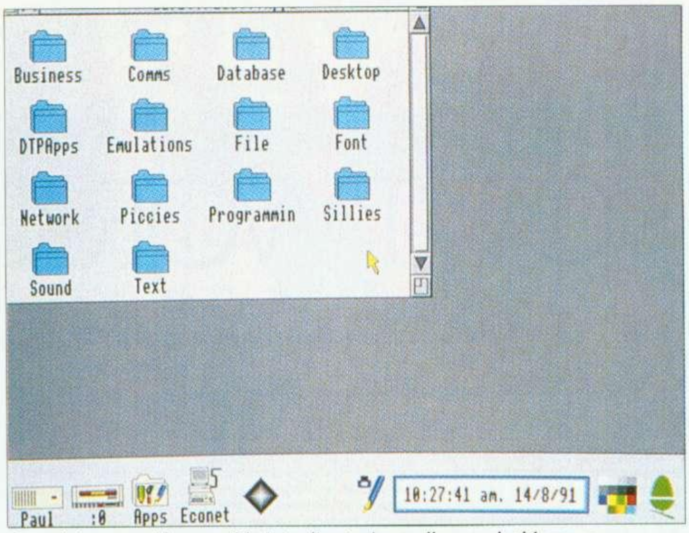
next level above. Similarly, double clicking Adjust on a floder in a directory viewer will open that folder, but close the window that you've just come from.

You may also find that many applications will allow you to use SHIFT-Adjust on the Close icons of their windows, and they will pop up the parent directory viewer from whence the file came. If you don't use these methods, then you end up clearing windows away every five minutes, just to see what you are doing!

TINYDIRS

Everybody has a copy of the *TinyDirs* utility. It is supplied with the machine on the Applications discs, and is one of the essential 'speed-up' programs. In short, it allows you to place an application or directory on the Icon bar.

As an example, imagine tgat you have a directory called *Sprites* and a directory called *Drawfiles.* You are working on a document, which involves taking sprites and *Draw* files. Instead of having the directories cluttering the screen (which will slow you down), load *TinyDirs*. Select both the *Drawfiles* and *Sprites* directories, and drag them onto *TinyDirs*. Both directories will appear on the icon bar, and one click on either will bring up the directories.



Organising your files sensibly into directories really speeds things up

MOUSE SPEED

Mouse speed can be easily reconfigured. If you your mouse is set at a slow speed, then you may run out of mouse mat when moving the pointer large distances: that means you have to pick it up, move it back and then carry on moving the pointer – hardly economical. A good value for the speed of the mouse is four. This means the mouse covers some ground with a little movement (the width of a mode 12 screen is about 3cm).

This can be set up as permanent by typing *CONFIGURE MOUSESTEP 4 at the command line (press F12 to access this). If you haven't got a mouse mat, then get one – you can waste quite a bit of time trying to persuade the pointer to move, since the mouse ball slips on a shiny surface. At a pinch, a copy of *BAU* makes quite a good mat.

HARD DISC USERS

If you have a hard disc, then you'll find yourself flipping between some directories more than you flip between others. If this involves several clicks of the mouse, then it may be an idea to set up a signpost. This is my name for a little obeyfile that opens up another directory viewer.

Setting up a signpost is simple. Load *Edit* and press Menu over its icon on the icon bar. Move over the Create submenu and choose Obey, and a window should pop up. In this obey window you need to type in the instruction to open the directory viewer you wish.

The command you need for this is Filer_OpenDir, followed by the pathname of the viewer. This can be found out from the title of the directory viewer itself. For instance, if you wish

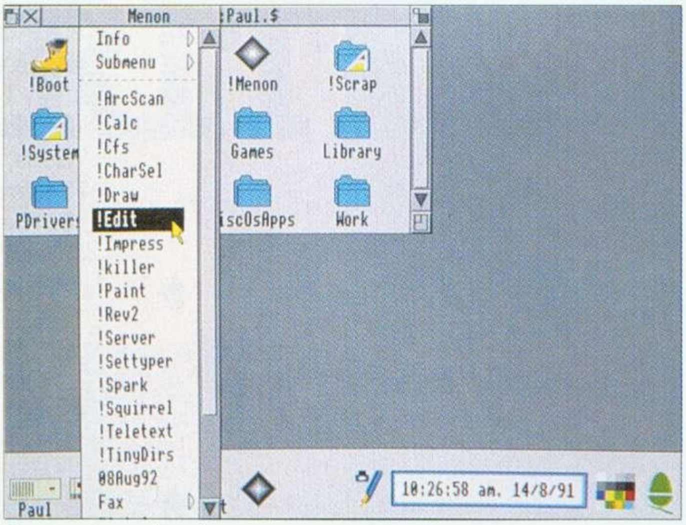
to open the directory *$.Work.Letters* then the command line: Filer_OpenDir ADFS::4.$.Work.Letters will do. Make sure that the pathname at the end of the command is exactly that of the one in the title bar of the directory viewer – upper and lower case letters are seen as different characters here. If you make change one letter in the command, it may not work, or it may allow you to have two versions of the same directory viewer on the same screen.

Risc OS 3 users might like to know that SHIFT-dragging a file on to an *Edit* window won't load the file into *Edit*, just its pathname but be careful – this format is not compatible with Risc OS 2.

Another thing that can cause you to slow down and will disrupt the flow of your work is a full hard disc. And to weed out all those unwanted files, applications and other gubbins when you get a 'Disc full' message can be a very time-consuming business.

You can avoid this situation by watching out for files or applications that you don't use as you work. Then, every so often, delete that odd bit of public domain software that you haven't looked at for a couple of months, or compress your old work into an archive, by using a package like *ArcFS* or *Spark*.

Imagine that you wanted to load six sprite files into *Paint*. Instead of double clicking on each file, using Select to select the first one, and then Adjust to select the other five is much quicker. Then you can drag this selection on to *Paint*. Of course if you wanted to simply print them, you would just drag them all on to the printer driver instead.



Menon gets you there fast

MENON

Menon is a small but perfectly formed public domain utility that could speed up your work a lot. Everybody in the *BAU* office uses it – so we thought we'd share the benefits around and now you'll find it on this month's subscribers' disc. Once installed on the Icon bar, it allows you to drag a file or an application on to it. It adds this to its menu, and when you choose this option from its menu, it will load the file or application.

Menu options can be given hot keys (For instance, you can set *Menon* it up so that pressing CTRL-I loads *Impression*), and they can also autoload. This means that when you load *Menon*, you can ask it to load a printer driver and a word processor and then open your work directory by executing a signpost file.

LET'S HEAR IT!

You may have found your own ways of doing things fast and easily, so send in your hints and tips for speeding things up to, Quickies, BBC Acorn User, 101 Bayham Street, London, NW1 0AG. We will publish the best short cuts in a forthcoming episode of ✱INFO. Each of those we select will win a small cash prize, and of course, the quick route to fame for the author!

THE WRITE STUFF

Graham Bell looks at two improved wordprocessor packages

If ever a Risc OS application deserves more recognition, it is undoubtedly *Easiwriter*. Icon Technology's Risc OS word processor is carefully designed, well implemented, and it does the job: if you want to write fairly structured text with sections, sub-sections and so on, but you don't need the extra facilities of a complex page layout program, then *Easiwriter* is for you.

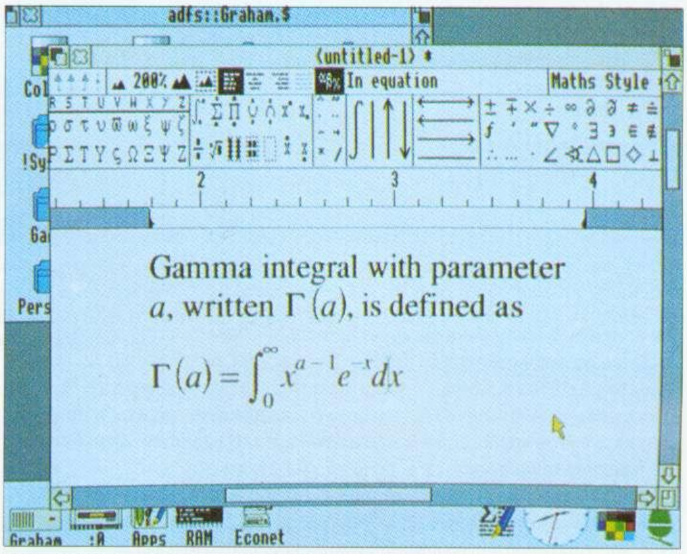
While the 'tick list' includes outline fonts, as-you-type spelling checks, multiple-column layouts and very clever table formatting, the first version of *Easiwriter* was criticised for its lack of mail merging, which prevented it being adopted as a general-purpose application. Icon has now remedied this with *Easiwriter* version two.

TECHWRITER

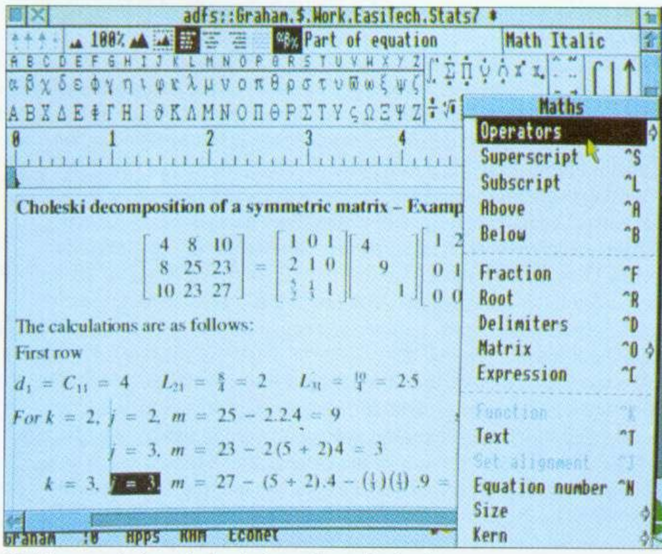
Icon has also boosted the academic credentials of its latest application, *Techwriter*, by adding equation editing and footnoting to it.

Techwriter boots up looking exacly like *Easiwriter*. And indeed if you don't want any of its new features, then you can use it exactly like its 'parent'. This approach is supported by Icon's upgrade policy – you can move up to using *Techwriter* for the difference in price.

Being based on *Easiwriter* means that *Techwriter* inherits all of the former's strengths and weaknesses. Each is a fully WYSIWYG wordprocessor, making full use of the Risc OS outline font system, and with all the usual editing features, like as-you-type spelling, that you would expect, plus items that you might not, like undo, multi-lingual spelling and hyphenation, tables and white space control. Both packages are based on a structured approach



Techwriter can now cope with equations such as this gamma integral



Matrices can be inserted as just another sub-structure

to writing – documents are made up of a series of chapters, each one divided into sections and sub-sections.

The concept of styles is quite different in *Techwriter* and most other word processing packages, as it covers both the typographical look of the text – which typeface, point size, line spacing and so on are used, just like any other outline font-based word processor – and also the structuring of the text. Each structure has a 'shape' or style: a document has a title in a particular text style, and a body consisting of a number of chapters, multiple columns and so on; a chapter has a chapter title and a body, and so on.

You can change the characteristic shape of each of these structures easily by changing one example then saving the new structure style. In fact you can create several styles for particular structures – perhaps for paragraphs in different typefaces. If you change a style like 'Section style', then all the other sections using that style follow suit. But the scope of your changes depends critically on what you select to start with – there's a steep 'learning curve' before you get the hang of it.

Inserting a structure like a section is simple: you choose the structure from the menu, then type. The first paragraph you type automatically becomes the section heading, and following paragraphs make up the body of the section. The available structures include pictures and bulletted lists – you can include both drawings and sprites, with Risc OS 3 extensions like 256-greyscale sprites and drawings with rotated text.

In addition to the structure styles, you can of course make local changes to the text (effects, in *Impression*'s terms): typeface, point size, line spacing and so on, are all controllable over any area you select with the mouse.

Some of the neater parts of *Easiwriter* are even more relevant to *Techwriter*, in particular its table formatting. Tables are just another structure, which you can insert in the text at will. As you type the first line, pressing TAB inserts more and more columns.

On the second line, the columns automatically line up, and magically re-arrange themselves, so that the columns fit as well as possible. This remains impressive, particularly when you can select the rows and columns of the table and add rules and borders. Another impressive feature is the multi-lingual ability: you can mark text as German as easily as you can mark it in bold – easier in fact. German text follows German

hyphenation rules and can be (optionally) spell-checked with the German dictionary.

But the real forté of *Techwriter* is its equation editor. Equations are just another structure, and can be inserted in the same way, both within a line of text and as 'display equations' on a separate line.

A menu option or a button in the ruler bar displays a Greek palette at the top of the *Techwriter* window: it shows all the items that can be inserted into an equation. After beginning an equation, parts of it can be picked from the palette. There's a full selection of Greek letters and mathematical symbols which, when printed use EFF's MathsPhys outline font (included in the *Techwriter* pack).

Complete equations are built up by picking structural elements from the central section of the Greek palette: fractions, roots, integrals, summations and so on. As you pick, say, a summation sign, the cursor jumps to below the sigma, ready for you to type in the lower limit of the summation. Pressing RETURN jumps to the upper limit, then to the end of the summation, ready for you to type in the function itself.

It is all easier than you might expect. *Techwriter* follows the rules of technical typesetting fairly intelligently, automatically putting in items like minus signs (ALT-153) even when you type a hyphen, inserting spaces around operators like ×, and so on.

Matrices can be inserted as just another sub-structure, and work just like tables: it's easy to control the number of rows and columns. And there are 'flexible elements' of equations that can vary in size according to what they refer to. Root symbols are an obvious example, where the tail of the root extends to encompass the whole of the following expression.

Lines, arrows, king-size integrals, over and under bars can be added at will, though it can be difficult to make separate elements of an equation consistent in size – matrix brackets vary a little if the matrix includes elements like fractions as well as normal numerals. An important element in equation setting is the balancing of big symbols like flexible integrals and itty-bitty text like subscripts. *Techwriter* almost always gets this right, and only rarely do you have to force it to make an alteration. There is also a 'cookbook' section of the well-produced and well-paced manual, full of typesetting tips. No doubt the answer to the matrices is there somewhere . . .

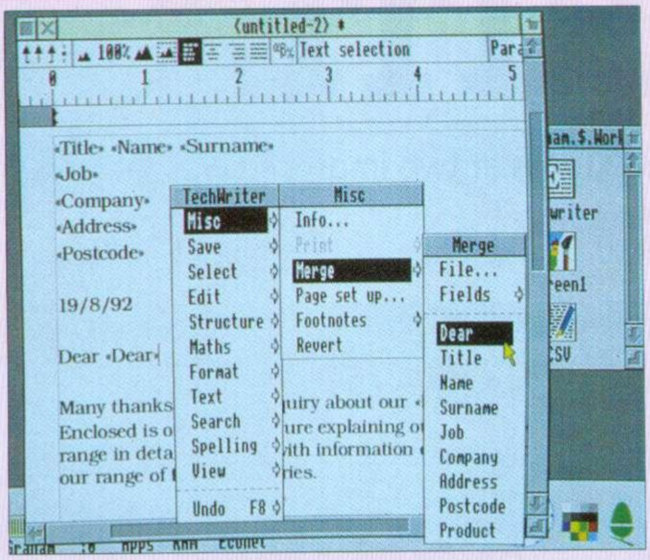
The other extra that *Techwriter* offers is footnoting. Once again, it's another structure – which means you can choose typeface, size and so on, as well as alter the alignment and layout style. Inserting a footnote structure puts either a superscript number in the text and puts the cursor at the foot of the page ready for your not text. Notes are automatically numbered on each page, and re-numbered if you delete a note or if a note moves to another page as a result of editing the text.

A menu option allows you to choose numbered notes or dagger-type symbols, and the footnotes to be changed to endnotes at will. *Techwriter* avoids the classic footnote trap (where a multi-line note is referenced on the last line of normal text on a page) by continuing the second line of the footnote on the next page.

The key difference between *Techwriter* and an equation editing package like Computer Concepts' *Equasor* is that equations are an integral part of the *Techwriter* wordprocessor: thet are not embedded drawings, but remain editable all the time. And they can be freely mixed with any of the other *Techwriter* structures.

Looked on as a complete package for producing technical and academic documents, *Techwriter* is nothing short of excellent. Perhaps the only drawback is that individual equations cannot be saved as drawings, for incorporation in other files, and this might be important where the page-layout facilities of *Techwriter* fall short of your needs. But there is little doubt that *Techwriter* and *Easiwriter* should be the word processors of choice for academics creating structured text. If this is your field, the seemingly high price of £200 to £250 will be well repaid.

MAIL MERGE



Both *Techwriter* and version two of *Easiwriter* – which is bundled with the new A4000 Home Business package – have new mail-merge facilities. This is an area where many good packages founder. It's important to make the mail-merge simple enough to use that people don't avoid it: it has to be easy to create the merge files, and a preview of the merged letters is vital. *Impression* and *First Word Plus* are both less than successful here: both use separate merge applications; *Impression*'s costs extra and *First Word Plus* is of fearsome complexity.

Easiwriter and *Techwriter* take the view that the data for the merge file will most likely come from a database. And so they can import any CSV or TSV file (comma or tab separated items of data, with a merged letter using data from a single line of text. If you don't have a database of the relevant names and addresses, then such a file can easily be made up in *Edit*. Or, rather neatly, you can make up a file in *Easiwriter* or *Techwriter* – as a table structure.

A Merge . . . dialogue box allows you to specify the name of the file the data is in. More likely, you'll drag the data file onto this dialogue. If it comes from a *Squirrel* database or something similar, you can press the Headings button – *Squirrel* puts its field names on the first line of data.

Writing the letter for a mail merge is just like writing any other, except that where you have a 'personalised' item like a name or postcode, you insert a 'token' for it. This is where the headings come in – the tokens for each heading can be inserted into the letter from a menu. Once complete, the merged letter can be printed. You can print a preview with tokens instead of real data, or preview and even edit individual letters on screen, or print out the lot.

The scheme is based on the way word processors like Microsoft *Word* work, and it is very simple, particularly when used with a database like *Squirrel* that supplies headings. And you don't need to stick to names and addresses. Text within the body of the letter is reformatted for each letter, so longish items can be drawn out of a database too – including Squirrel 'text file' fields stretching over several lines of text.

Because the link to the database isn't direct, you can't merge pictures – only plain text, numbers, dates and so on. But it is by far the easiest mail-merge system of any Archimedes wordprocessor, and greatly widens the appeal of *Easiwriter*.

For businesses put off by version one, *Easiwriter* is definitely worth a second look. It is still notably slow saving and loading on networks or floppy disc, but its most fundamental problem has been removed.

PRODUCT DETAILS

Product: Techwriter,
Price: £250 (non-educational), £200 (educational)

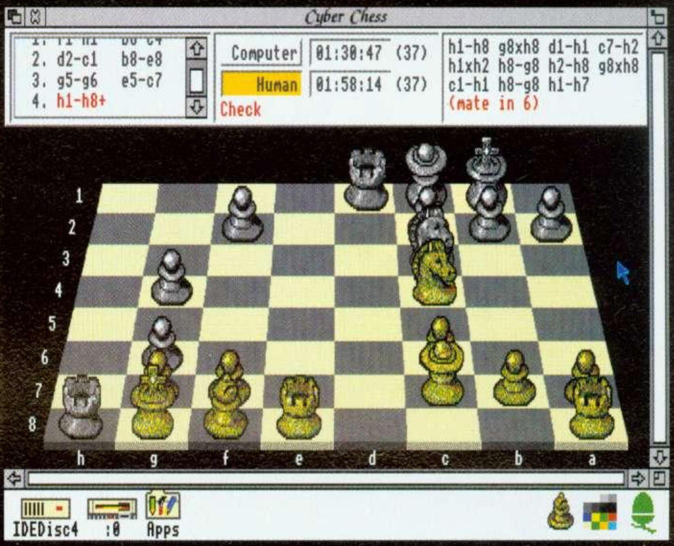
Product: Easiwriter
Price: £150 (non-educational), £120 (educational)

Supplier: Icon Technology Ltd, 5 Jarrom Street, Leicester LE2 7DH Tel: (0533) 546225
Site licences available at four times the above prices. All prices exclude VAT

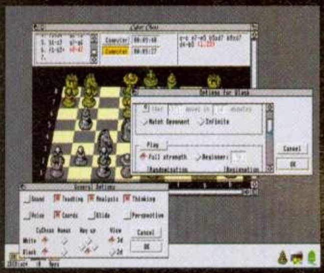
PRODUCED by The Fourth Dimension .... THE Acorn Games Specialists

Cyber Chess





"The Definitive Chess-Playing Program"









Chess is probably the most popular game in human history. It has survived for fourteen centuries and is as successful today as ever. Thousands of people have dedicated their lives to its study and over ten thousand books have been published on its theory.

Now the Fourth Dimension is bringing the full magic of the game to Archimedes owners with its latest product, *Cyber Chess*. This represents one of the highest specification chess-playing programs available for ***any*** micro-computer. Over three sides of A4 paper is needed just to name the features present in the program. Some of its main points are:

SUPERB 3D SIMULATION

- A near complete 3D simulation of the game. Animation is used to move the pieces smoothly around the board; pieces are picked up and dragged by the human player to their new squares.
- Designed for total clarity. The board is carefully arranged so it can be played from without difficulty. A large alternative 2D view is also provided as an option.
- High-quality digitized stereo sound and speech.

RISC OS COMPLIANT

- Runs from the desktop in a window; fully multi-tasking and intuitive; follows the 3D style associated with high quality software.
- Multi-windowed. Any number of games can be opened and running from one incarnation of the program (within available memory). A sophisticated internal scheduling algorithm allows *Cyber Chess* to drive all computer opponents/games simultaneously whilst still smoothly multi-tasking with other desktop applications.

FIDE RULES

- Full implementation of all applicable chess laws, including en passant captures, underpromotions, 50/75 move rule etc. Even resignation and draw by agreement are supported.

HIGH SPEC MACHINES

- Optimised for an ARM2, mode 12 system. But takes full advantage of a faster processor or even extra RAM to produce a higher 'full strength' playing standard and smoother animation.
- Thoroughly tested with RISC OS 3; supports saving of the desktop.

BACKGROUND

- The publisher, The Fourth Dimension, is the premiere specialist games house for the Archimedes with a string of classics dating back several years. *Cyber Chess* represents the latest in superb 3D simulations following on from great best-selling successes such as ***Chocks Away, Saloon Cars*** and ***Break 147 & Superpool.***
- The author, William Tunstall-Pedoe, has been developing commercial software for Acorn machines for nearly ten years including several high-quality Archimedes products. He has a First Class Honours degree in Computer Science from Cambridge University and spent over a year studying computer chess research in order to produce *Cyber Chess*. This project is by far his most substantial yet and was designed from the beginning to be the definitive chess-playing program for RISC OS machines.









Acorn A3000, A5000 & Archimedes Price £49.95

Please ring for details regarding Site Licences

The Fourth Dimension, 1 Percy Street, Sheffield, S3 8AU Tel. (0742) 700661 or 769950

SUPPORT FOR BEGINNERS/CHILDREN

- You can learn chess from scratch using *Cyber Chess* with the tutorial supplied.
- 100 beginner levels are provided going from 0 (very very weak) to 99 (reasonably competent). This encourages beginners/school chess players to continue playing by not demoralising them and allows them to monitor their progress as they begin to beat higher levels. When they beat level 99 they can graduate to 'full strength' mode.
- Teaching option shows you which moves are legal as you play.
- If a player gets stuck a hint can be requested.
- The names of the openings can be announced as they are played quickly familiarising chess learners with the various opening systems.

SUPPORT FOR STRONGER PLAYERS

- State-of-the-art chess algorithm.
- *Cyber Chess* can perform analysis, giving the best line of play from the current position and an estimate of who is winning/losing and by how much.
- Full tournament time controls (e.g. "40 moves in 2 hours and then all remaining in 1 hour") can be set up. Time controls can be set for human players as well as computer opponents to simulate real tournament conditions.
- State-of-the-art opening book supports opening traps and advice. Multiple books are provided and new ones can be added or existing ones edited.
- Even the style of computer play (defensive, attacking etc.) can be adjusted to taste or to prepare for a match against a similar human opponent.

BLACK ANGEL





Let chaos rule with ultimate power



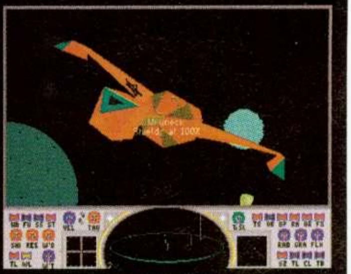


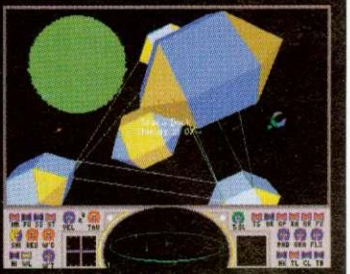
The Universe is old, very old, and your fourth generation galaxy is dying. Chaos rules with total power. There are no laws save those that nature imposes and any that you choose to impose upon yourself.

Evidence has been uncovered of an ancient civilization which may have inhabited a third generation galaxy. A civilization which seems to have beaten nature's limits of time and motion. A civilization which could travel faster than light. A civilization which may have outlived the death of its mother galaxy and which may even have had the power to leave the universe itself.

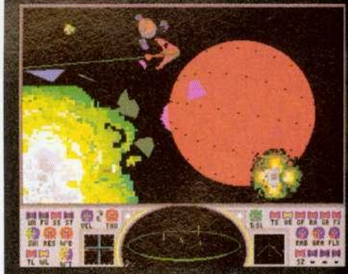
Of course very few people believe what can be read in the five billion year old religious scripts. They choose to believe that the Star Gates are a natural phenomenon, they choose to become extinct.

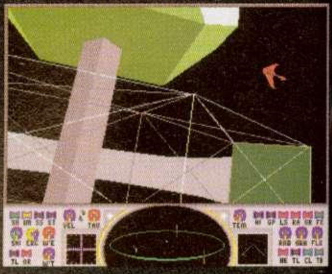
But you believe, you and a few others like you. Choosing to throw yourself into incredible debt in order purchase a second hand star fighter, you must now roam the galaxy searching for the parts to the key that will unlock the Star Gates. Though because this is real life and not some romantic tale, you will also need to earn a living to pay off your debts and maintain your ship. And don't forget the Tau Hoppers, those who take and do what they want, and if need be, use general relativity to escape into the future.

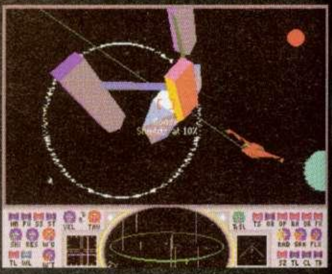












Your Ship:
Maan Industries Langhort Kestral

Drives	Twin gravitational displacement units (Super-string drives). Plus standard impulse and fusion units. All drives are fully linear in their operation.
Antidrive	Maan industries string tie.
Acceleration Rate	0-200,000 Kph in 17 seconds.
Terminal Velocity	.99999 C. achieved in 158 seconds.
Minimum Tau	.00447
Rest Mass (unloaded)	1.27 Tonnes.
Max Mass (unloaded)	283.98 Tonnes.
Hull Construction	.15mm vitrified magnesium sheet, atmospheric pressure supported.
Shielding	Electrostatic.
Fuel System	Interstellar hydrogen net with a 400ckm catchment field.
Weapons	6 universal weapons carrier pods fitted with 14Mw Gas lasers fitted as standard.
Weapons' Options	10Gw Plasma Beam. Absorption cannon (PAC). MUSPAC. Absorption torpedo (PAT). MUSPAT

All standard guidance equipment plus time displacement compatibility.





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Including A3000, A5000 and all Archimedes - Release hopefully August '92

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Saloon Cars DELUXE





The Improved Driving "Game-ulation"!









UPGRADE for ½ PRICE Only £17.50

This new improved DELUXE version of *Saloon Cars* includes many new features suitable for upgraded machines and A5000s, plus many new features suitable for all machines......

REAR-VIEW MIRROR

Improved rear-view mirror.
Improved improved rear-view mirror suitable for Arm3 users.

COMPATIBILITY

Compatible with Course disc to be released soon (see below).
Compatible with Formula 1 upgrade to be released in response to demand for a decent Formula 1 simulation on the Archimedes (hopefully late 1992).
Compatible with Saved Players from ***Saloon Cars v1.0***.

GRAPHICS

New car graphics, featuring the most sophisticated vector graphics ever seen in a home computer game, allowing full 3D rotations of cars - other cars can actually spin off the track in front of you.
More realistic crashes, allowing other cars to have smash-ups almost as spectacular as your own (2MByte only).
Gameplay has been enhanced immeasurably by the addition of a completely new loading screen.

COURSES

New practice course (Test Track), easier (less hard) to stagger round than the old one.
Even more detailed and realistic features on most courses.
Detailed and Fast modes on some courses to allow use of the full potential of the Arm3 without compromising Arm2 users.

BORING TECHNICAL JARGON

Can be installed onto and run from Hard Disc.
Features minor refinements to the more anomalous features of the original ***Saloon Cars v1.0***. (Most of the bugs have been fixed!).
Unique integration process allowing speed variations in processing to maintain the highest possible frame rate at all times whilst maintaining perfect real time simulation of the race. (The game doesn't slow down when the graphics do!).
Special mode for machines with more memory which uses the extra capacity to enhance the speed and complexity of the graphics.

AND FINALLY

Many more features which we want to be a surprise.
Probably a few more features we haven't even thought of yet, and....a few we didn't think up at all.

OLD FEATURES

Saloon Cars DELUXE still...
does not provide a realistic simulation of a full time office job,
does not make the coffee,
and it still isn't quite as good as actually going out for a drive in a Sierra Cosworth.

OLD REVIEWS OF *SALOON CARS v1.0*

"*Saloon Cars* is the definitive racing game. It is pure, unadulterated fun." ***Archimedes World '91.***
"Make no mistake: the speed and smoothness of this game has to be seen to believed." ***Syracuse '91.***
"...you cannot help but be astounded at the gameplay." ***Club A3000 '91.***









Acorn A3000, A5000 & Archimedes Price £34.95

To upgrade simply return the whole original *Saloon Cars* directly to us plus payment. We'll send you the newly packaged / enhanced 3 disc DELUXE version on release.

SALOON CARS DELUXE COURSES

The new *DELUXE* version still contains the 2 real courses, Silverstone and Brands Hatch, plus a newly designed wide practice course called Test Track ideal for beginners.

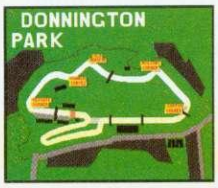


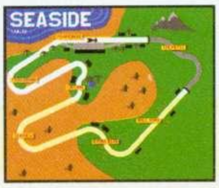


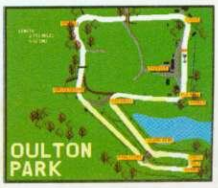


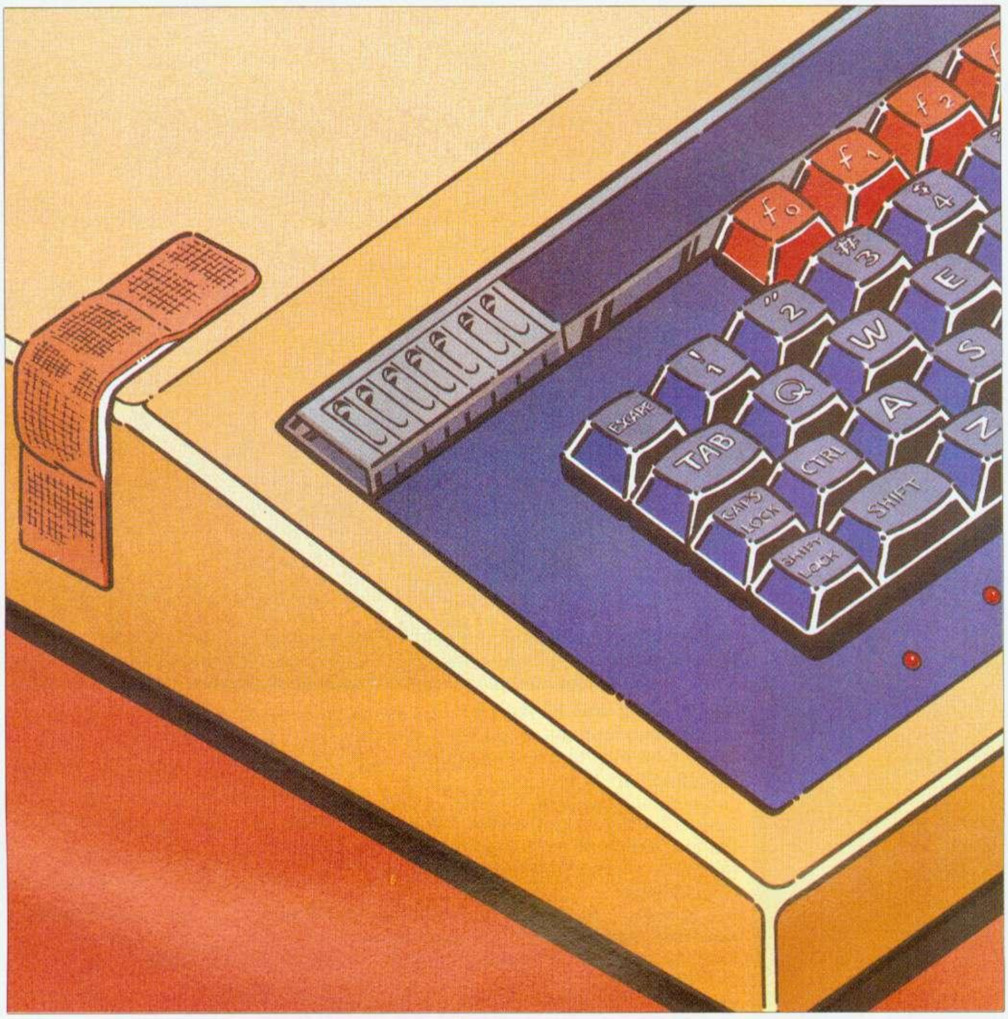
SALOON CARS EXTRA COURSES

This new Course disc contains 3 superb new courses which are only compatible with the new *DELUXE* version. They cost £19.95 and will be released hopefully in late June '92.









KIM LANE

Old Beebs never die, they only fade away! Richard Garrett finds out how to nurse a Beeb back to good health

A QUICK **FIX**

As the blues song says, 'ten years ain't no very long time' but, in a world obsessed by mips and megabytes, it seems strange to the uninitiated that so many people are still using a microcomputer that was released ten years ago.

If you were to go on safari for ten-year old machines you might find the odd Commodore PET, Apple II, or RM 380Z clunking along but, before you as far as those, you'd trip over an awful lot of BBC Model Bs.

Today, there are hundreds of thousands of Bs, B pluses, Electrons and Compacts in use and new Master 128s are still on sale. Reasons why people remain attached to them vary from the personal to the political, but the Beebs soldier on, regardless.

Or do they? Designed, as they were, to withstand use in primary schools, BBCs are, of necessity, robust and hardwearing but, after years of service, they do go wrong. This article looks at the commoner complaints afflicting them, some of which you can easily cure yourself.

FINDING FAULT

On the computer itself, the most frequent problems crop up with the keyboard. The simplest of these occurs when a keyswitch gets 'gunged up' with dust and grease. This can make the key stick, producing unwanted 'auto-repeats' of an individual letter, or it can cause a bad connection which stops the key registering altogether. (For solutions to this and other 'easy' problems, see the box on DIY repairs.)

Other keyboard faults are generally the result of long-term 'bashing' by enthusiastic users. Sometimes individual keyswitches get broken and new ones need to be soldered oon to the circuit board (the arrow keys are usually the first to go). A repair company I talked to quoted a price of £9 a switch, plus labour, for this little problem.

Failures that affect many or all of the keys are usually due to breaks in the 17-way cable linking the keyboard to the main circuit board, or to cracks in the keyboard's printed circuit board. If you are happy using instruments like a multimeter or continuity tester, you can check these components yourself or, given access to another computer of the same model, you can test them by swapping parts between the good unit and the faulty one.

Replacement connectors and keyboards are available from Watford Electronics (connectors: £4, Model 'B' keyboard: £46, Master keyboard: £59, all excluding VAT).

While we're talking about the wear and tear of hardware, it's a good idea to keep a set of spare cables for your micro. This should consist of a monitor lead, a printer cable, a disc drive cable and whatever else

you use regularly. These things are like fuses – they always go on a Sunday when you can't get a replacement.

Among the things that can go wrong, actual 'chip failure' is relatively uncommon. Although integrated circuits do 'go soft' – the minute impurities that conduct electrical signals through them diffuse into the silicon – the designs used in BBCs are, on average, good for 20 to 30 years.

The ICs that get a lot of punishment and are liable to fail first are memory and memory decoder chips. These are mostly surface-mounted on the main circuit board so, if they go, you'll need a professional with a soldering iron to replace them. Chips are susceptible to static and overheating, so their lives can be extended by periodically dusting the inside of the the case.

SLIPPING DISCS

After the keyboard, the disc drive is the most frequently used moving part in the system and, therefore, one of the elements most likely to break down. Read/write problems can sometimes be solved by cleaning the head(s) with a proprietary cleaning disc or by replacing a damaged multicore cable between the drive and the computer.

Older disc drives, however, often simply wear out and, due to scarcity of parts and the cost of labour, if the unit is over four years old it is often more economical to replace it than to repair it (new disc drives start at about £70).

Probably the most expensive form of breakdown is an RGB monitor failure. When you get that fine white line across the middle of the screen that tells you the tube is blown, you're looking at a sizeable bill. Replacing a Microvitec 1431 tube is about £150. This is less than the cost of a new monitor (about £200) but pretty close to the education price.

Warning: monitor repairs should only be attempted by skilled technicians. There's 25,000 volts on that tube so don't even think about taking the back off unless you're qualified to do so!

When writing this article, I wondered if any BBC components are so out of date as to be irreplaceable. I checked and, so far, none of them are. Some, however, are no longer made and are becoming harder to get hold of.

A case in point is the original BBC B disc controller chip (8271) which now retails at £39. The good news here, though, is that, if supplies fail, there are other DFS kits around which will work with all but the oldest disc software. Master owners needn't worry on this score as their computers use 1771 controllers.

MAKING IT BETTER

Once you've eliminated the probable, to misquote Sherlock Holmes, the only thing left is to send it to the menders. This is not as easy as it once was. It's not so bad if you're a school user in an Acorn-friendly LEA as they will probably have a repair contract with a firm in your area.

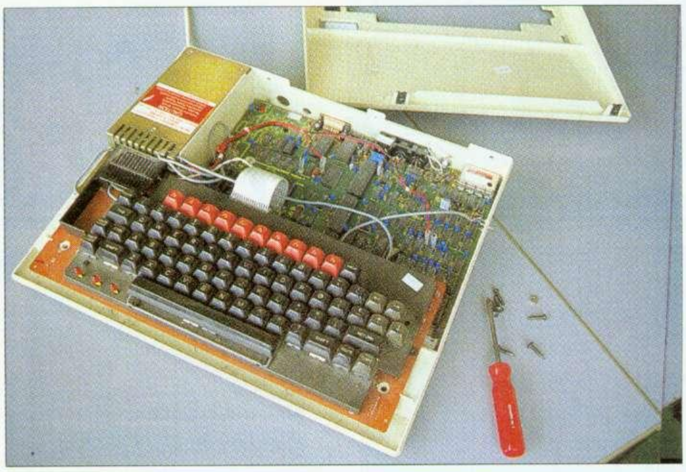
Some local education authorities even have their own technical staff who will come round and make repairs in school, but I haven't heard of any who offer this service to the general public yet.

In the private sector, things are more difficult. Skilled hardware people can make a lot more money fixing PCs than Beebs and most are doing just that, but a quick search through the computer sections of my local Yellow Pages revealed two companies who mend Beebs. Typical quotes were £25 to fix a couple of keyswitches, through to about £85 to replace a broken power supply unit. If you want a recommendation, talk to your local dealer.

So there it is, ten years and the Beebs are still going. Most problems that affect the computer itself are mechanical and can be repaired relatively cheaply. A broken disc drive can be replaced for a lot less than the cost of a completely new computer.

If a monitor dies and you're thinking of upgrading, you may choose to plug into your TV and put the cost of repairs toward that A5000 you've been promising yourself but, with most other problems, an investment of £50 to £100 may keep your system going for another few years.

The BBC computer is a remarkable design and, with its variety of inputs and outputs and the enormous amount of cheap software, it still meets the requirements of a great many people. In some areas of education, it remains the only machine for the job. One day, vital components will cease to be available and they will eventually fade away but, until that day comes, they'll be around a little while yet!



DIY: FAULTS AND FIXES

CAUTION! BEFORE DOING ANY OF THIS WORK, TURN THE MACHINE OFF AND UNPLUG IT FROM THE MAINS.

The lid on a BBC is secured by four large Philips (No.1) screws, two at the back and two under the front. Just unscrew them and lift the lid. If you need to move the keyboard, undo the smaller pair of bolts under the front of the machine. This is best done with the lid off and the computer the right way up over the edge of a table so that the nuts don't drop off and roll around inside the case.

IF . . .

. . . a BBC Master forgets what day it is and how it's configured: The battery's gone. Take the lid off, replace the four alkaline AA batteries and reset your options using the *Configure* programme from the intro disc or *CONFIGURE and TIME$.

. . . individual keys stop working or get stuck down: Usually caused by dust and/or grease in the keyswitch. First, take an small screwdriver and lever the cap off the offending key, then dust around the switch with a cloth and work some mild non-greasy solvent into the switch. There are proprietary aerosols that do this, or you can use iso-propyl alcohol and a cotton bud. If the solvent lifts any grit out of the switch, wipe it away with the cotton bud. Replace the key cap and see if it works.

. . . the machine fails to start up properly, paged Roms disappear, and so on: The BBC has a lot of chips in sockets on the main circuit board. These can 'ride up' over time and become disconnected. This gives rise to a variety of faults, all of which can fixed by gently pushing the chips back into their sockets with your thumb. Popular offenders are the five Roms under the right of the keyboard and the 5050 Ceefax chip on older machines. The 6502 processor chip on the Electron is also a common culprit.

While you've got the top off: Gently clean the inside of the computer with a clean duster or a small clean paintbrush. This can cut down keyboard problems and extend chip life.

GETTING HELP

- Acorn Customer Support on (0223) 245200: Call and they will tell you who your nearest Acorn dealer is.
- *BBC Acorn User*: send your problem in to our Questions and Answers page. We can't answer everything, but we do our best to help with a wide variety of problems
- Microvitec on (0274) 390011: As well as their own service department, the monitor company has a list of 60 authorised service centres around the country who can repair their products.
- Watford Electronics on (0923) 237774: A good supply of common components and replacement chips for the Model B and the Master, as well as leads, cleaning materials and so on.



Pete Worrall let a score of kids loose on some high technology – the results speak for themselves

VIDEO DIARY

A computer workshop in a public place is one way to demystify technology, revealing what is usually hidden away in a computer room. As an artist and IT adviser to Sandwell Educational and Microtechnology Unit, I often have the chance to 'set up shop' in public locations. One recent event was a hectic workshop set up in the normally peaceful museum of Wednesbury.

The aim of the workshop was to use video cameras to create on-screen images, which were then manipulated to get some unusual works of art. I arrived at the scene, complete with a car-load of Pineapple digitisers, A3000 computers and video recorders. As if on cue, no sooner had I set up shop than a group of children peered cautiously around the door.

As always, such inhibitions were quickly shelved. Confronted with live images on screen, the children quickly absorbed explanations, demos, and hands-on experience. Before long, they were were filming, digitising, recolouring and collaging themselves. As their shyness dissolved, I introduced face-paints and balloons to create an instant party atmosphere and, more importantly, provide a new dimension to the work. The very presence of recording equipment often improves the quality of the result, by lending importance to the event.

It is important to encourage children to experiment visually. Odd camera angles, the use of personal objects and colourful backgrounds are all simple ways to create exciting results. Each child tried out the role of artistic director by taking charge of both cameras and computers. In fact, one of the ingredients of a successful workshop is to let the children control the visual elements as soon as possible.



Using a backdrop, a video and an A3000 to create the picture above

By the end of the morning, I had 38 portraits saved on to disc, a three-hour video recording of the workshop and some very satisfied customers. In the example shown above, one of the pupils used a backdrop to create an exciting composition. The facepaints were chosen to complement the backdrop and the resulting images were put together as a computer collage.

The following pages give a step-by-step guide to how a different image was produced, where balloons were used to create the visual appeal.

STEP ONE

PLANNING

For this particular workshop I needed two A3000s with 2Mb of memory each, two Pineapple digitisers, a box of formatted computer discs and a good selection of extension leads. Camera equipment was: two Panasonic video cameras (M7/M10); one video stills camera (the Canon Ion); one Pentax P30T camera; a tripod; two spotlights; and two videotapes. Last but not least we added face-paints, balloons, coloured paper, scissors, glue and felt-tip pens to the list of vital tools.

The A3000 version of the Colour Video Digitiser cost £235 from Pineapple Software contactable on 081-599 1476), whereas the the Panasonic M7 video camera retails at £550 and M10 video camera £859.

No doubt at this point the operation is beginning to sound impossibly expensive, but it is often possible to borrow the equipment. For instance, we borrowed the M10 video camera and digitisers from Sandwell T.V.E.I., the M7 camera from Willingsworth High School and one computer system from Sandwell Educational and Microtechnology Unit.

It is important to do some initial planning. There should be ample power points. You also need to check for any light sources that might interfere with screens and cameras. A good tip is to draw out a complete floor plan.

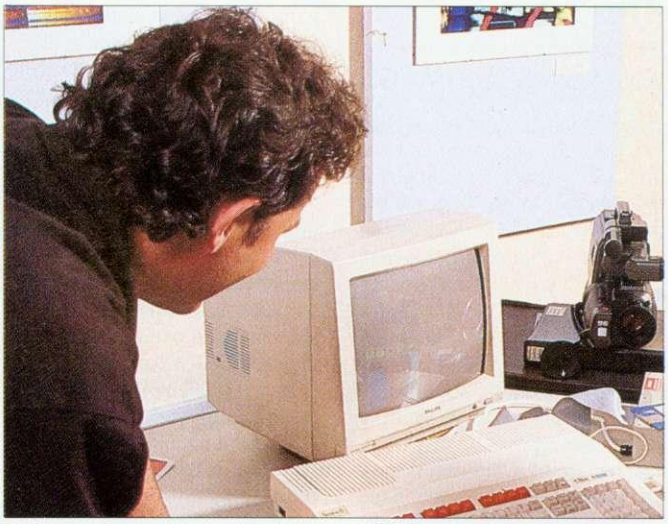
Advertise the event well in advance. (In my case, pupils from Willingsworth High School were invited to attend). At the risk of appearing antisocial, don't invite thousands of people, tailor the event to your equipment.

In this case the theme, 'video portraits' determined the hardware and software choice, whereas the size of room (500 sq m) dictated the number of systems.

I chose the Pineapple colour digitiser to use in the workshop, as it is a solid, reliable piece of equipment that can be easily operated by children of all ages (from primary school level onwards).

This digitiser box for the A3000 fits in the expansion podule and needs two discs to operate. Disc one offers still image processing and easy colour manipulation, so it proved an ideal tool for making video portraits.

An enhanced version of disc one costs £17 extra and this can add text and fades for image presentation. Disc two was not used in this workshop, but it allows sequential frame-grab and play-back.



Setting up the workshop with videos, an A3000 and some creative props

STEP TWO

GETTING THE IMAGE

On the day of the workshop itself, the most pressing problem for a workshop leader is how to pass on new skills to an unknown and rather unpredictable public audience in a short span of time. It is important to get people relaxed, so the use of additional stimuli to make everyone feel at home is a very good idea.

Correctly chosen props can give any live event that special something extra: back-drops using balloons and streamers, mirrors for double-takes, face-paints, masks, personal 'found objects' and even music can be used in this way.

The notion of placing props in these situations is to humanise a possibly daunting technological environment and also to act as social ice-breakers. Whatever is brought in can add another personal element to the event: strange headgear or a favourite poster could be good choices.

In this video workshop, the children decorated their faces for camera shots and used balloons for backgrounds, resulting in personal and unusual screenshots.

As time went on, the children became more adventurous and competitive and I had less and less to do, except for the application of a certain amount of discrete direction when required.

Sometimes I found I had to move spotlights, adjust a camera position or help to fix a new backdrop in place. It became fairly clear after a while that, even when the use of the software had been mastered by the audience, there were still plenty of things remaining for the workshop leader to do.



The scene is recorded, complete with balloons, while the participants watch the screen waiting for the right image

STEP THREE

CHANGING THE IMAGE

The Pineapple digitiser is supported with two discs and the MICCI disc (standing for Miniature Image-Check/Control Icon) It has a multitude of uses for image processing and can give creative and varied results. The MICCI front panel, when loaded, shows a video area which can display the output from a VCR, Canon Ion or the live feed from a video camera.

The output resolution is easy to control using the three tuners on the front of the digitiser, which cover Gain, Lift and Saturation – just like the controls on a colour TV set. From the start, the children should be shown basics like loading the program, a description of the mouse functions and the saving routines.

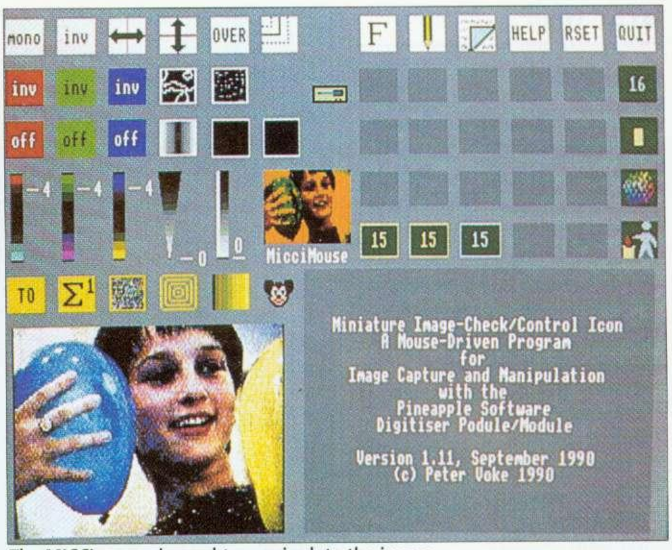
The most important thing to follow at first is image capture. To do this, select the Sparkle icon. This moves the image into the centre of the Micci panel, as a still grabbed image. From here there are a wide range of options available using the Mode 15 squares as 'workframes'.

Initially, use the Image size pre-select toggle on Size one, (full screen) to try the colour resolutions. Then turn this off and images of any size can be stretched and overlapped using the excellent Image Action button (instant psychedelic pop art is created).

To save a screen, place a blank formatted disc into drive 0 and drag the Mode 15 box onto the floppy disc drive 0 icon, and follow the prompts, which will result in a 160K sprite being saved on to disc. At this point, you can experiment with different camera positions, lighting effects, backgrounds and props.

During the workshop, the introduction to the software took about 20 minutes. The clear design of the MICCI control panel invites the user to experiment, and it does not take long before colours are altered using the red, green and blue toggles and the colour sliders, which produce some impressive effects.

Distortions, zooms, reflections, transparent overlapping and multi-image collaging were all produced by the children during the workshop. All this happened in a short time, and without the additional use of any standard art and design software, although later on this can be used to enhance the work further.



The MICCI screen is used to manipulate the image

STEP THREE

THE FINAL IMAGE

Looking through a set of 24 prints photographed from the screen during the workshop, I discovered many different effects: Kerry with her hair standing on end, Kirsty with make-up resembling Charlie Chaplin, and Richard surrounded by a background of his own teeth were just a few of the pieces of art that were produced that day.

The picture shown here is the final Kirsty portrait, and demonstrates the instant recolouring capabilities of the software. The composition using the balloons is balanced, with the hand lending additional interest and Angela is watching the MICCI panel on the computer screen with obvious enjoyment.

The colours have a print-like quality and are created by moving three colour sliders, which increase or decrease the colour contribution. This is significant, because a reflected figure in the balloon was accentuated through simplifying the colour-scale.

Everything contributes here towards an excellent video portrait. It is worth noting that there are eight different versions of this image that, I hope, will form the starting point for a painting or a set of prints back at school.

For those who want to try out a similar technique at home or in the classroom, this scenario can be adapted in many ways. Dance, theatre or mime lend themselves well to this type of project, as do sports, natural phenomena and even scientific processes.

I recently set up a computer system in a greenhouse to capture images of a butterfly: it just goes to show that the only limit is your imagination.



The final image was picked from a disc full of alternatives

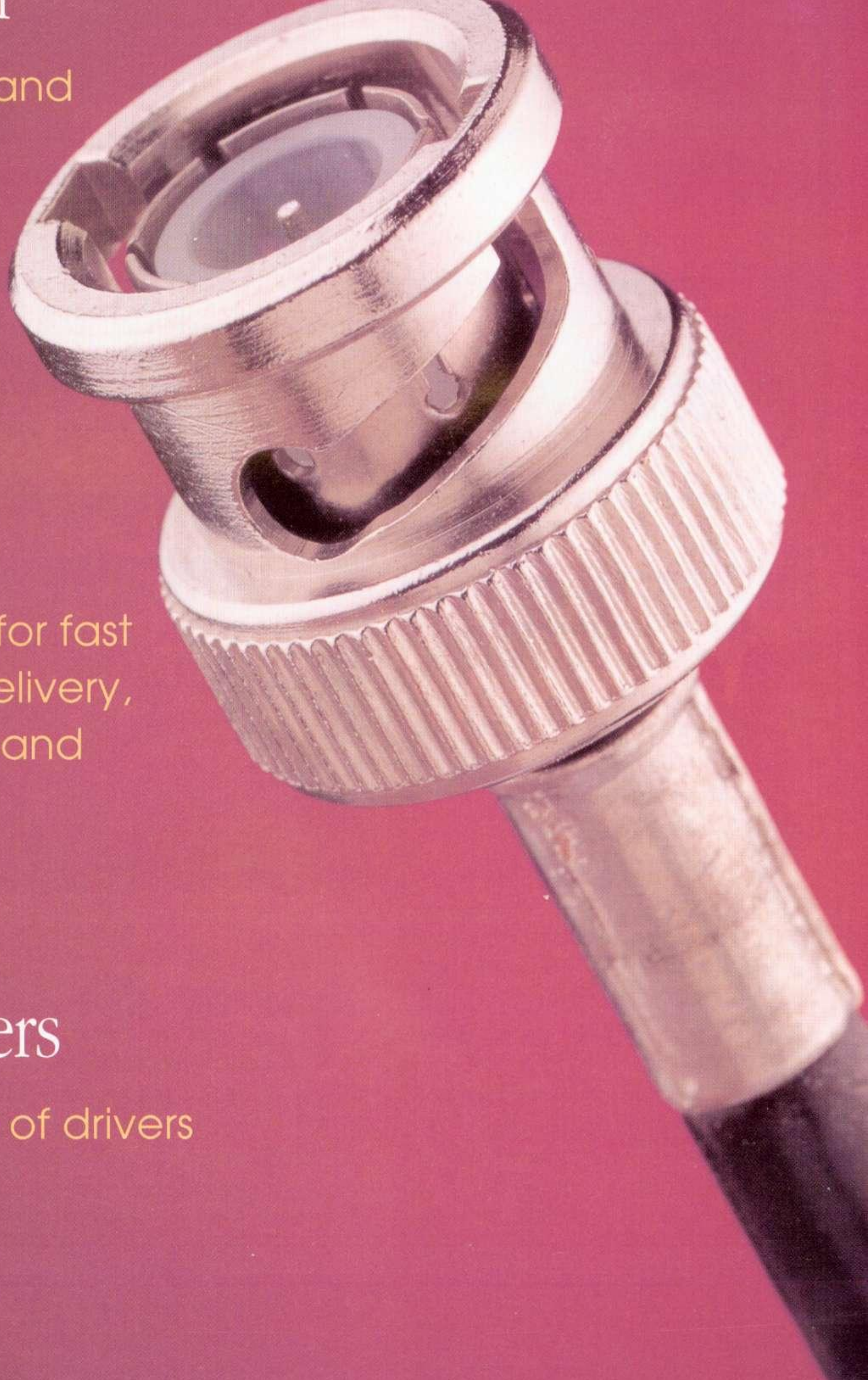
Pete Worrall is a professional adviser on the use of IT in school. He is currently employed as head of Art and Design at Sandwell Educational and Microtechnology Unit in the West Midlands

Co-ordinate IT

A Promotional Feature on Oak Solutions Educational Products   Autumn Term 1992

Design Processor

a revolution in design and technology software



ClassRom
ClassNet
ClassShare

the complete answer for fast secure applications delivery, data storage, clusters and networking

Ace Printer Drivers

a powerful new range of drivers for RISC OS 3

multimedia in the primary classroom

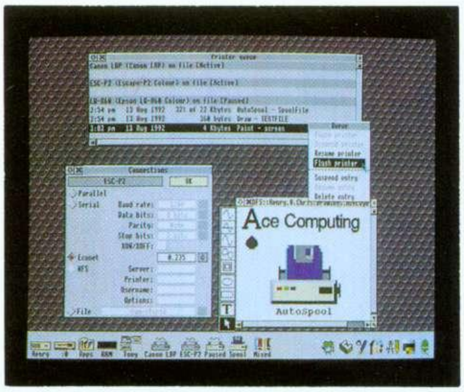
ProDrivers for RISC OS 3

Upgrade to !Printers for all printers supported as standard by RISC OS 3 gives:

- 24 bit colour for ALL colour printers
- CMYK colour separations from ALL printers
- Spooling and background printing for ALL printers

New printer drivers for the following printers giving all the above features:

- PaintJet, PaintJet XL, PaintJet XL300 and DeskJet 500C
- Epson ESC-P2 printer standard
- Canon LBP4 and LBP8 (driven via parallel port!)



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Cambridge
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!Printers upgrade	£25 (ex VAT)
HP Colour ProDriver	£40
Epson ESC-P2 ProDriver	£40
Canon LBP ProDriver	£40
Standard drivers	£16

The best selling SCSI drives for the Archimedes

16-bit SCSI Interfaces

A3000	£83.50
A300/400/500/5000	£83.50
CDFS Upgrade	£38.25

Worra Winnie Internal Hard Discs A300/400/500/5000

40 Mb	£275.00
100 Mb	£415.00
200 Mb	£675.00

Worra Winnie External Hard Discs A3000/A300/400/500/5000

40 Mb	£315.00
100 Mb	£455.00
200 Mb	£715.00

High Speed Internal Hard Discs A300/400/500/5000

40 Mb	£305.00
100 Mb	£440.00
200 Mb	£695.00

High Speed External Hard Discs A3000/300/400/500/5000

40 Mb	£355.00
100 Mb	£485.00
200 Mb	£745.00

Elite External Hard Discs A3000/300/400/500/5000

40 Mb	£450.00
100 Mb	£590.00
200 Mb	£850.00
300 Mb	£1235.00
680 Mb	£1650.00

Worra Tape Streamer

60 Mb	£545.00
150 Mb	£730.00

High Speed Tape Streamer

60 Mb	£690.00
150 Mb	£805.00

Elite Tape Streamer (DAT)

1 Gb	£1605.00

Magneto Optical R/W Drive

560 Mb	£3100.00

CD ROM Drives

Worra CD	£299.00
High Speed CD	£399.00

Prices shown include SCSI interface (except CD ROMs which require SCSI card and CDFS upgrade).
Always state computer type when ordering

Each hard disc comes complete with the following FREE software: Genesis, Euclid, Disc Tree, RISC OS Companion, Worra Battle.
Prices shown are Education Prices, and exclude £10 p&p and VAT



We Lead - Others Follow

Oak Solutions Ltd. Suite 25 Robin Enterprise Centre Leeds Road Idle West Riding of Yorkshire BD10 9TE Tel: 0274 620423 Fax: 0274 620419

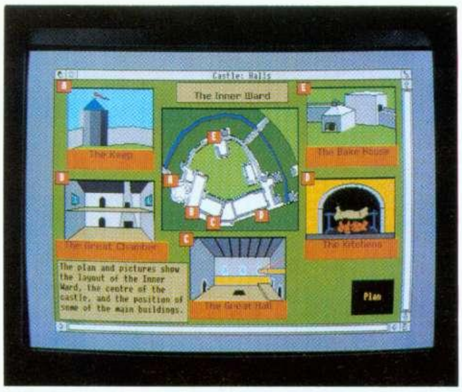
OAK SOLUTIONS

QUALITY RELIABILITY COMPATIBILITY PERFORMANCE

Castle Life

The Foundation series of courseware products are all developed, using Genesis, by practising teachers, advisory teachers and advisors. Each Foundation product is designed for use in the classroom and is accompanied with additional material such as worksheets and teachers' notes. Particular care has been taken to ensure that there is material for use away from, as well as at the computer.

Castle Life was the first application in the Foundation Series to be launched. It was created using Genesis and comes with a Browser so that it can be used by those who do not already have Genesis. Castle Life allows children to make their own exploration of a medieval castle. Using plans, views and text, they can investigate and visit each part of the castle and the people who lived and worked there.





The application is designed to give children the opportunity to plan their own learning or to follow a theme, rather than following a fixed sequence. Drawfiles, animations and music help to bring history to life.

The application is accompanied by a set of photocopiable worksheets, designed to stimulate individual and group work away from the computer.

Castle Life costs £50.00, and the price includes a site licence.

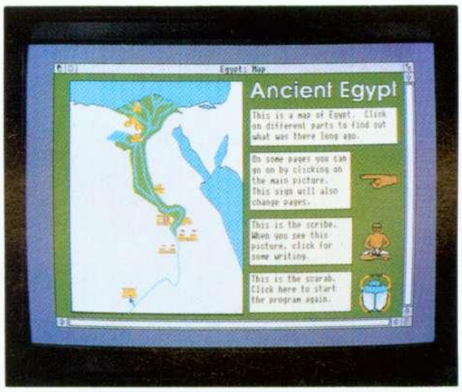
Ancient Egypt

A new offering in the Foundation Series is Ancient Egypt. This valuable addition to the growing range of courseware products allows children to investigate the land and society in the time of the pharaohs. Children can explore buildings, life-styles and beliefs, using maps, pictures and animation as well as text.

The application is supplied in two versions, one with easier text for younger children, and comes complete with teachers' notes. A pack of photocopiable worksheets are included. These are based on the application, but are intended to involve children in activities away from the computer. Discs of drawfiles and sprites for use in children's own work are available separately.

Ancient Egypt helps to address History Key Stage 2 Supplementary Study Unit on non-European society as well as Technology Attainment Target 5 Information Technology capability.

Ancient Egypt costs £50.00, and the price includes a site licence



Welcome

Welcome to the first edition of *Co-ordinate IT*. The aim of *Co-ordinate IT* is to disseminate information about current and future developments from Oak Solutions. In conjunction with this first edition, we are launching a demo software pack. For £4 including VAT and P&P we will supply a pack of discs containing demonstration versions of WorraCAD, OakPCB, MaVille and Foundation History. The £4 will be refunded if full versions of any of the software packages are purchased.

Over the coming months, Oak Solution's technical team will be touring key education centres throughout the UK to demonstrate Design Processor and the new ClassRom, ClassShare and ClassNet systems. If your education centre would like a visit, ring 0954 211760 and arrange an appointment with David Tee.

Information about products from Ace Computing is included because of a new joint marketing and development agreement between Oak Solutions and Ace. Both companies have agreed to work together in certain key areas, such as Computer Aided Design, to avoid duplication of effort and to accelerate development programmes.

And late news just in - a third member has joined the Developers Consortium. Iota Software has agreed to share resources in the areas of marketing and development.

Contents

A Revolution in Design and Technology Software



After more than three years of development work, Design Processor was finally launched in March this year ...but what on earth is it?

Design

Software available for Design and Technology traditionally has comprised applications such as CAD systems, PCB design, Art packages, Kitchen Layout and Control software - these are known as content free applications and are designed to allow drawings, circuit boards and documents to be created from scratch but contain little or no information about the items they are designed to create.

Thus, whilst software tools were available for designing in a wide range of areas, users had to look elsewhere for information about the items they were designing. Often, a seemingly attractive piece of software would be met with the comment, "I can see what it can do - but what can I do with it in the classroom?"

Back in 1988 the Association of Advisors in Craft Design and Technology (since evolved into the National Association of Advisors and Inspectors in Design and Technology - NAAIDT) came up with a concept to remedy this situation. The association got together with Oak Solutions, Acorn's largest independent software house, to develop the idea and to implement Design Processor as a product.

Since the inception of the project the development team has grown to include a host of Education Authorities, Advisors, Advisory Teachers, Teachers and some of the top programmers on the Archimedes.

The Acorn Archimedes was chosen as a platform because it was the only affordable machine that provided the performance required and had a multi-tasking desktop-type operating system which allowed separate programs to communicate - something that proved central to the way Design Processor works.

Over the last year, Design Processor has been previewed to a variety of audiences and gradually refined until in March this year, it was released and received widespread acclaim. So, what exactly is Design Processor?

Geoff Howard, Senior General Inspector/Adviser for Design and Technology in North Yorkshire and leading representative of the NAAIDT on the development team, "The idea behind the development of the Design Processor was to produce an integrated design environment where pupils could work in a variety of design contexts and have access to a range of appropriate tools such as CAD systems, resources - pre-defined objects like electronic components, kitchen units etc. and information relevant to the design contexts.

Key Stage 3 & 4

Processor

The information should be readily accessible at any stage so that, for example, when designing an electronic circuit, if information is required regarding a particular component, it should simply be a matter of pointing at the component with the mouse and selecting an appropriate menu option to cause Design Processor to display information about the selected item.

Additionally, any data created by the system should be able to be output to a wide range of appropriate output devices including printers, plotters, cutting plotters, embroidery machines and CNC machines. The Design Processor should be targeted initially at key stage 3, 4 and above, but should be expanded to cover lower age ranges in due course."

It soon became clear that Design Processor could not be released as a static package, but one which would evolve over the years to cover new areas and to keep pace with developments in Design and Technology. When it was released in March, Design Processor covered three main areas, each with its own information section with text, pictures and animations which could be easily extracted for use in documents, reports, worksheets etc. These initial areas were:

1. Packaging, with a range of pre-defined 'nets' and software tools to manipulate the dimensions, add artwork or even design new packages from scratch and then output them to paper, card and other sheet materials.
2. Electronics, with libraries of components and pre-defined 'building block' circuits, pcb and schematic design tools, logic circuit simulation, resistor colour code calculator, automatic generation of costing and ordering information and the facility to automatically generate schematic and pcb layouts from simple block diagrams.
3. Kitchen design, with libraries of commercially available kitchen units, walls, doors, white goods and furniture, automatic generation of costing and ordering information and the facility to automatically generate 3D views from a simple 2D plan.

Work is already under way on new areas including clothing, CNC, food technology, mechanisms and control. Updated versions will be issued to users as new areas become available or existing information, such as component costs, is updated.

Users of Design Processor are encouraged to become involved in its development by suggesting areas for improvement and contributing material for new areas. Future plans include the possibility of establishing user groups and publishing a regular users' magazine.

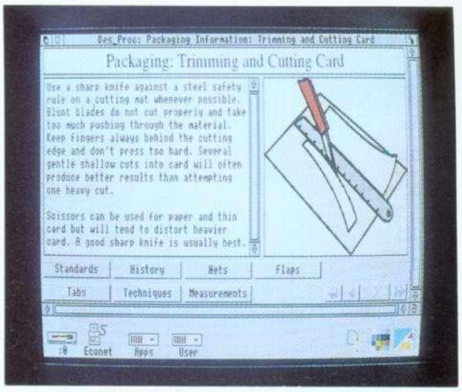
Development groups meet regularly in several education authorities and help to keep Design Processor on course by making sure that its contents are up to date, that it is relevant to use in the classroom, and remains easy to use. This unusually high degree of user involvement has helped to refine Design Processor so that regardless of the design context, the software is always driven in the same way.

Phil Driscoll, who heads up the Design Processor team at Oak Solutions. "The use of the Archimedes meant that we could provide a user interface that was consistent throughout the whole system so that movement from one application to another could be dealt with transparently, and the users would not have to keep learning how to drive a new piece of software.

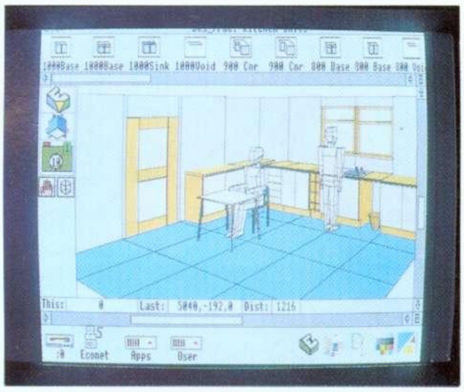
More importantly, it meant that the user interface was consistent with RISC OS software that users were already familiar with, and in most cases, the files created in Design Processor are compatible with the existing software base.

Whilst the full Design Processor system requires a computer with a minimum of 2Mb memory and a hard disc, we have made sure that individual software packages and resources can be extracted from the system to be run on 1Mb 'floppy disc only' machines - and as each Design Processor is automatically supplied with a site licence, there are no copyright problems with use on multiple machines."

Geoff Howard, "We are convinced that Design Processor represents a major step forward in the use of computers in Design and Technology. Design Processor encompasses, in an integrated package, the existing capabilities of several discrete design programs and more - pupils are not faced with a blank screen but are actually prompted to make sensible design decisions without undue prescription as to what they should be. It's a bit like having access to a range of construction kits with the ability to alter the size and shape of the components."



You really need to see Design Processor to appreciate how smoothly and seamlessly it all fits together, there's no confusion over choosing the correct piece of software for a particular job - Design Processor sorts all that out automatically. Children have had no difficulty using even advanced features such as moving from a 2D view of a kitchen to a 'live' 3D model and then working out what the kitchen would cost.



Design Processor is clearly poised to make a significant impact on the productive use of IT within Design and Technology.



Oak Recorder

£29.95



Oak Recorder is Oak Solutions' low cost sound sampling microphone - the ideal way to capture sounds for your Archimedes. Oak Recorder consists of a hand held omni-directional electret condenser microphone, with integral wind shield and on/off switch, which simply plugs into the printer port of any Archimedes (including A5000) via a 3 metre length of shielded cable.

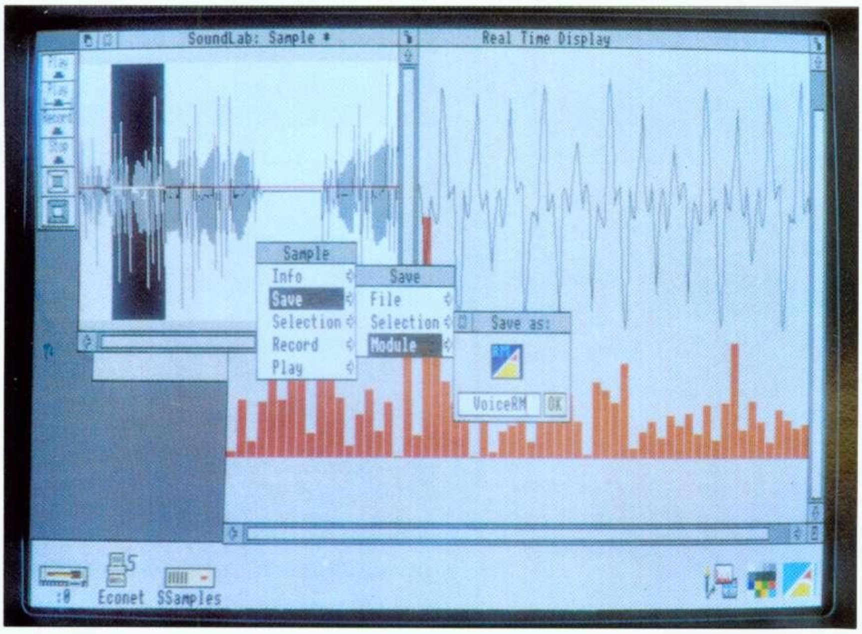
Oak Recorder is robustly manufactured to withstand the rigours of the classroom, and could not be easier to use. The software supplied with Oak Recorder allows samples to be recorded, played back and transferred to Genesis II and other Archimedes applications via the standard Armadeus file format.

Oak Recorder has several modes of operation; recording may begin on a button press, or be set to start when the sound level exceeds a certain threshold. Sound samples may be edited, and the start and end positions of the sample may be adjusted so that only the required portion of the sound is saved.

A Genesis II support module and application is also supplied for users wishing to integrate real-time sampling within their own Genesis applications. This allows exciting applications such as talking books, interactive modern language self study packages, special effects for school drama productions and sound libraries to be created. Add £3.00 to cover p&p.

£14.95

Sound Lab



In response to demand from users, an enhanced version of the software supplied with Oak Recorder has been produced. Many new features have been added, and these will be particularly useful to those with Archimedes music packages and for use in the school physics laboratory.

Sound Lab allows samples to be turned into relocatable modules to provide voices for applications such as Maestro, or to allow the internal voices of the computer to be replaced - your computer could be made to say 'sorry' instead of just beeping when an error occurs!

Sound Lab also provides a real time display with a spectrum analyser and a simple oscilloscope - ideal for investigating waveforms and for doing simple experiments.

Add £1.50 to cover p&p if not ordered with Oak Recorder.

Don't forget to order your Oak Recorder

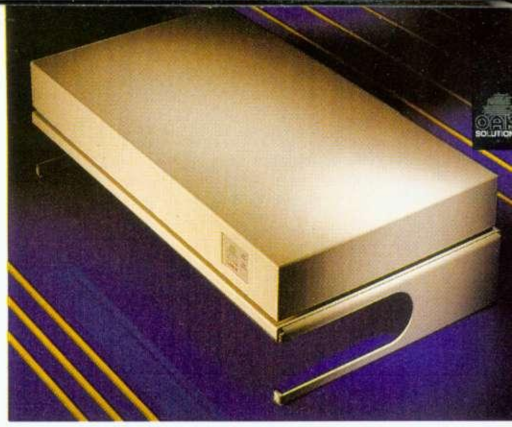
Prices exclude VAT   Telephone for Education Prices

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QUALITY RELIABILITY COMPATIBILITY PERFORMANCE

Products for IT Management

If you have a problem with managing your computers, read on as we take an in-depth look at the ClassRom, ClassShare and ClassNet products from Oak Solutions.



As computers become more widely available in schools they are also becoming more sophisticated. It is not uncommon to find computers with 4 M bytes of memory, hard discs, laser printers and colour scanners filling IT rooms across the country. With this increased availability and sophistication comes an increased management problem for those IT Co-ordinators responsible for looking after the school's IT resources.

Oak Solutions has developed a management philosophy which caters for single stand alone computers through to a large school-wide network. The Class Management philosophy breaks down into three major products ClassRom, ClassShare and ClassNet; each addressing a different but related set of problems.

ClassRom

ClassRom deals with problems associated with using hard discs on computers. Without a doubt, adding a hard disc to a computer radically improves the usability of the system. No more disc swapping when applications require a new font, almost instantaneous loading of applications and what seems like unlimited storage.

However, in a school environment there are drawbacks. The structure of applications and system resources stored on the hard disc is important and if any important files are overwritten or deleted, this could stop the system working. As hard discs are read/write devices this means that there is no protection of the applications from the user. This is where ClassRom comes in.

ClassRom is a system of protecting hard discs. It 'partitions' the hard disc into two separate areas; one which is protected (the Applications partition) and one which is read/write (the User partition). All applications, system resources and fonts are stored on the Applications partition. Here they are accessible to the users but cannot be altered or deleted in any way. The User partition is used for temporary storage of data either by the system or by the user.

The IT Coordinator has a management disc which allows the Applications partition to be unlocked in order for new applications to be added or old ones deleted. This software is password protected for maximum security.

ClassRom is available as a ROM upgrade for Oak Solutions SCSI cards, complete systems including hard disc and SCSI controller card or as a small plug-in board for A5000 and A4000 IDE drives or A300/400 series ADFS drives.

In a network environment, where each computer has a ClassRom attached, the management software allows them all to be managed simultaneously. If the manager wishes to add an application to each computer, he or she updates one of the hard discs manually and then uses the software to update the rest over the network. If several changes have been made, this process can be set up to take place overnight.

So, ClassRom solves the two main problems with using hard discs on computers within an educational environment, stopping the students deleting the software and managing twenty or so individual hard discs.

ClassShare

If you currently have floppy disc based computers and would like to add hard discs to each but don't have the money, the ClassShare system may solve your problem. Based on the principles of ClassRom, ClassShare allows a number of computers to share the ClassRom hard disc of another computer. A ratio of 4 computers to each hard disc is recommended, however, more computers can be connected if required.

The way it works is very simple. Take a scenario where you have one A5000 and 3 A3000s. The A5000 is setup as a ClassRom, and is configured to run the ClassShare software automatically on start up. Next, each of the computers (A5000 and A3000s) has a ClassNet interface and cabling added which allows communication to take place. The A3000s are configured to be ClassShare 'clients'.

When the machines are switched on they all see two hard disc icons; one representing the Applications partition and the other the User partition. The A5000 is directly connected to the hard disc but the A3000s are connected via the ClassNet. The A3000 users don't know this, however, and continue using their computers as if they had local hard discs. This 'transparent' setup means that any user can go to any computer and be familiar with the way in which it works.

At a later date, there is no reason why the A3000s could not have their own ClassRoms attached, improving overall system performance.

ClassNet

The ClassNet system mentioned above is the latest development in networking. Oak Solutions have combined industry standard Ethernet® hardware with a set of no-compromise protocols to deliver the fastest network yet produced for the Archimedes. Internal ClassNet interfaces are available for all Archimedes including the A30'N'0 and A4000.

ClassNet uses standard Ethernet cabling to interconnect the computers and setting up a small network couldn't be simpler. BNC connectors are used rather than the 5-pin DIN connectors used with Econet. One part of a T-piece is fitted onto the back of each interface and the other two parts are connected to the cable. At each end of the network, a terminator is plugged on to one side of the T-piece. ClassNet requires no clock.

From a user's point of view, ClassNet looks just like Econet. If you are familiar with using Econet to log on to file servers then you can already use a ClassNet network. In fact, all your existing Level 4 File Servers, Printer Spoolers and Disc Sharers can still be used with ClassNet - it just works 40 times faster!

As ClassNet uses industry standard components, large school-wide networks can be built around off-the-shelf Ethernet Repeaters and Bridges. This means that there is a greater choice of supplier and many more people who are able to install your network.

Similarly, it is possible to run Acorn's AUN software on the ClassNet interface to gain access to other types of network and file servers via an AUN gateway station. Users may then log on to the remote file server as if it were connected to the same network. By supporting AUN and industry standards, Oak Solutions guarantee complete compatibility with Acorn's networking strategy, with the added advantage that the ClassNet protocols offer unparalleled speeds. >>

ClassRom technology is available from £34.95, ClassNet interfaces cost £149.00

What is ClassNet?

ClassNet is a no compromise, high speed network system designed specifically for Archimedes using standard Ethernet hardware and cabling. ClassNet provides a low cost way of connecting clusters of computers together without limiting future expansion. ClassNet interfaces utilise the very latest integrated Ethernet technology and allow connection to either Thick or Thin Ethernet cable. Using ClassNet, speeds of over 600k bytes per second can be achieved when loading from a Level 4 file server. It is possible to load Edit, Draw, Paint and Impression in under 10 seconds!

BBC computers using Econet

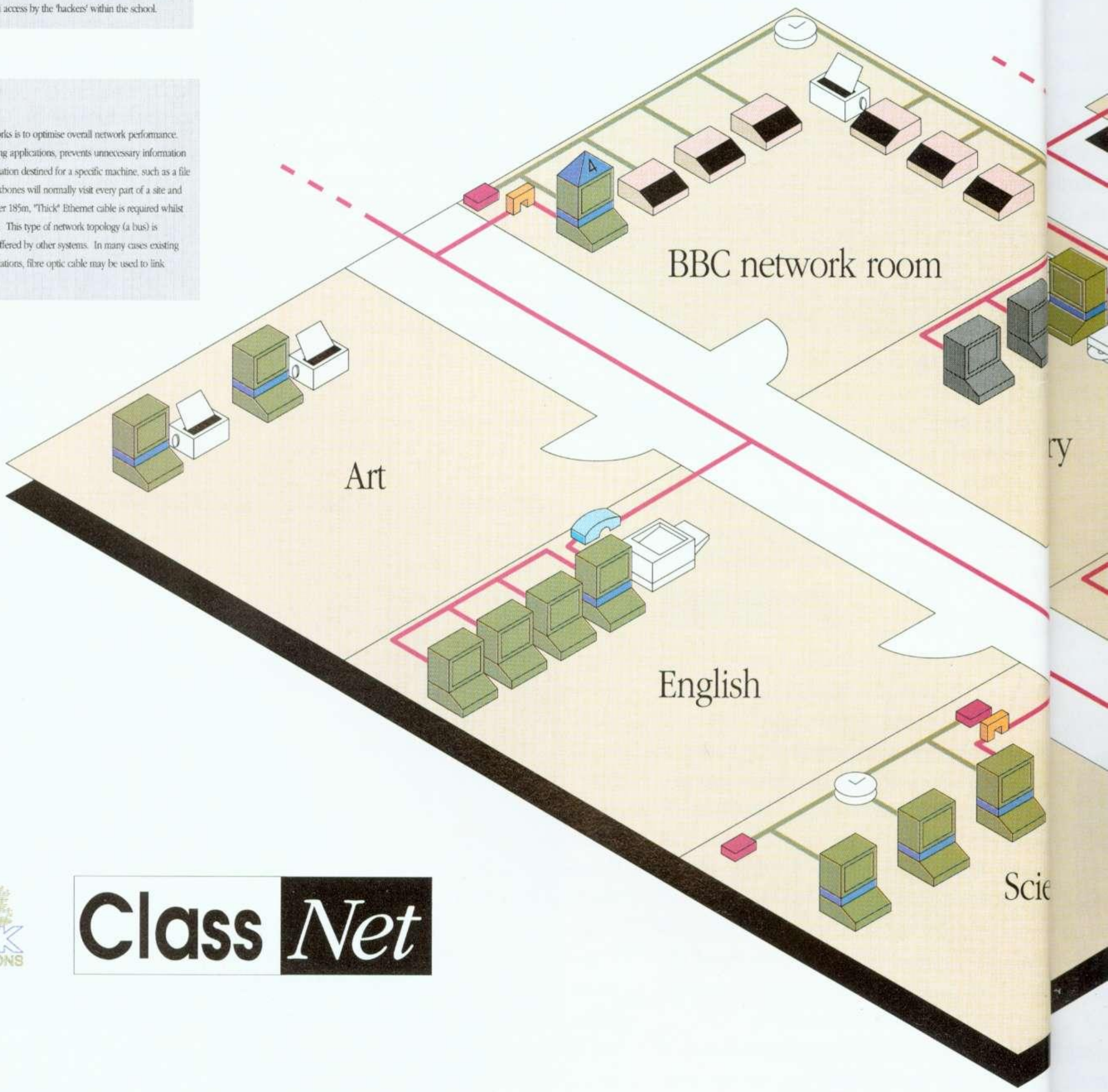
Existing Econet networks with BBC computers can be connected to the Ethernet backbone via a ClassNet/Econet gateway. This gateway is a piece of software which runs on an Archimedes and converts information between Econet and Ethernet formats. The BBC computers can transparently access any file servers connected anywhere on the network. Similarly, other computers can access file servers, such as Level 3 and FileStore, which are connected to the Econet. This transparent access enables full integration of existing technology with the new high speed networking system.

Sharing Ethernet with other systems

Many different computer systems can be connected to Ethernet. However, generally they all communicate in different ways. ClassNet is optimised for high speed communication between Archimedes computers, but there is nothing to stop other systems, such as PCs running LAN Manager or Unix machines using NFS, from being connected to the same network. To allow the Archimedes to communicate with other machines, special software such as Acorn's TCP/IP Protocol Suite can be used. We recommend that critical systems, such as school administration, should not be connected directly to the main school network, but perhaps separated by a bridge, so that confidential information is protected from access by the 'hackers' within the school.

The Backbone and Spur configuration

The reason for having backbone and spur networks is to optimise overall network performance. Separation of local network traffic, such as loading applications, prevents unnecessary information from saturating the whole network. Only information destined for a specific machine, such as a file server, will be transmitted outside the spur. Backbones will normally visit every part of a site and will therefore usually be quite long. For runs over 185m, "Thick" Ethernet cable is required whilst the spurs will normally use "Thin" Ethernet cable. This type of network topology (a bus) is substantially easier to install than star networks offered by other systems. In many cases existing Econet trunking can be used. For split site installations, fibre optic cable may be used to link separate networks together.



OAK SOLUTIONS

Class *Net*

Stand alone ClassRoms

ClassRoms need not necessarily be used within the context of a network environment; they provide hard disc facilities perfectly matched to classroom requirements. Pupils cannot accidentally (or maliciously) remove or alter applications, and yet they have all the benefits of the full speed of a hard disc and no requirement for disc swapping. The applications area of a ClassRom is immune from infection by viruses as the drive cannot be written to without access to the password protected management software. A ClassRom installed on a network can be removed from the network (e.g. for a teacher to take home at a weekend) and will still be fully functional as all the applications are resident locally.

ClassShare Clusters

ClassShare is a means of sharing a single ClassRom unit amongst several Archimedes. Each user sees two hard disc icons representing the applications and private user partitions. Users simply click on the icons in the normal RISC OS manner to access applications and data. ClassShare uses ClassNet interfaces to connect the computers together and hence can be used for shared printing. ClassShare clusters can be easily expanded into a full network by the simple addition of a Level 4 File Server.

ClassRom and Econet

Where Archimedes are to be used on an existing Econet installation, ClassRom provides the fastest and most manageable solution for applications delivery; over 1M byte per second is available to each computer regardless of the number of machines. Applications are stored o secure partition of the ClassRom hard disc and multiple ClassRoms can be managed from a s machine. Installing ClassRom units on an Econet system confers even greater benefits whe upgrading to Ethernet in the future. Other application delivery systems are tied to particula cabling systems which limit scope for future expansion. ClassRom is at the core of the whol ClassNet strategy and existing ClassRom users can easily upgrade their cabling system to pro faster access to file servers, shared printers and management services.

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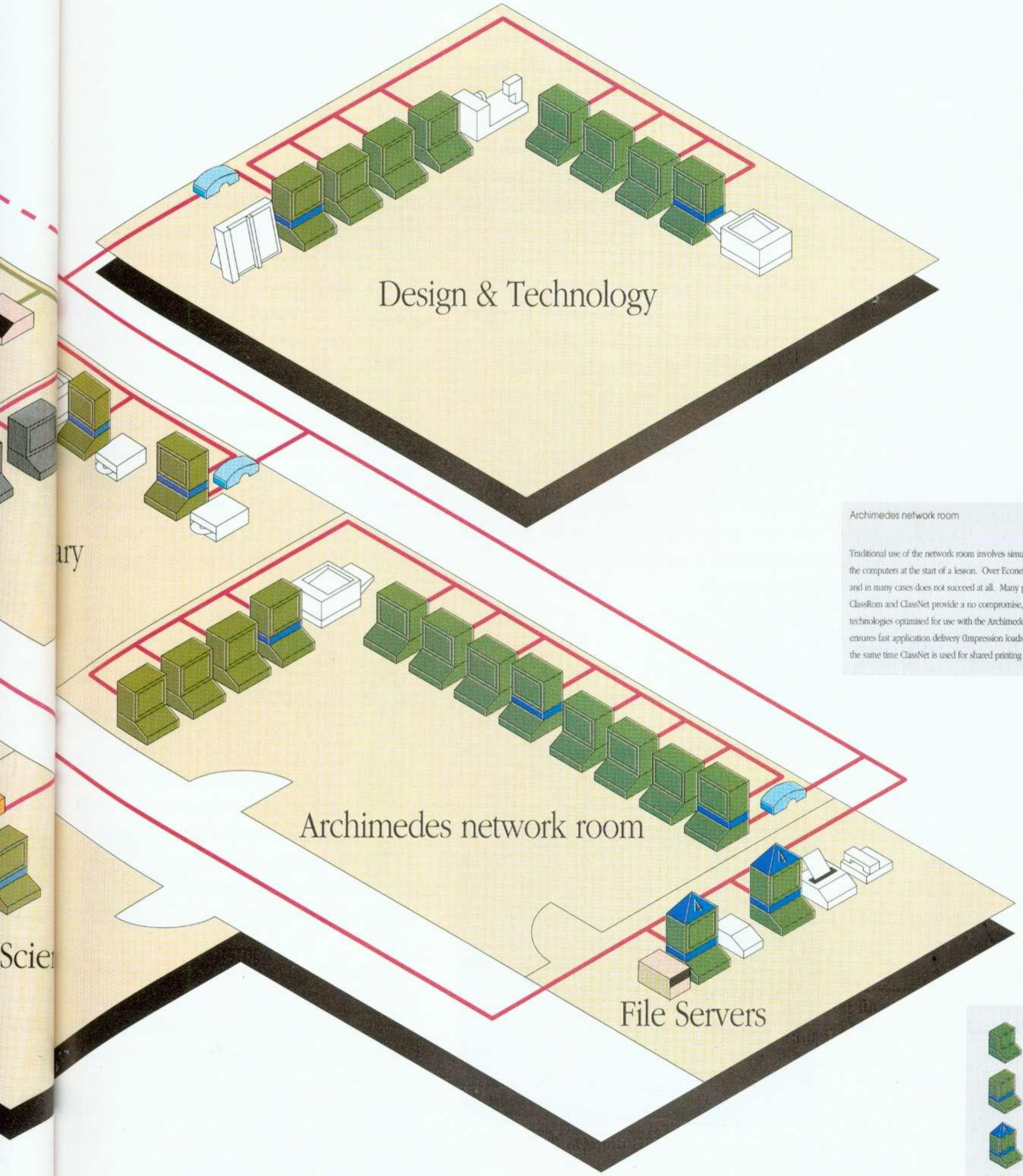
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CD-ROM across the network

The high speed of ClassNet provides the best possible means of sharing CD-ROMs amongst many users. The ClassNet interface card uses advanced cacheing techniques to optimise data delivery rates and to minimise problems caused by the slow access times traditionally associated with CD-ROM drives.

ClassShare Clusters in Design and Technology

Design and Technology is an area which can place the heaviest demands on the computing facilities. Very large applications, such as Design Processor, must be capable of being accessed quickly. Expensive, "data hungry" peripherals such as laser printers, plotters, CNC lathes and scanners must be accessible from all machines, and large quantities of users' data needs to be stored securely and at high speed. ClassShare clusters provide speedy access to applications and spooling facilities for all types of printers and plotters. File servers may be added locally or accessed via a bridge on the main network.



Archimedes network room

Traditional use of the network room involves simultaneous loading of large applications into all the computers at the start of a lesson. Over Econet this operation takes several minutes at best and in many cases does not succeed at all. Many products attempt to solve this problem but only ClassRom and ClassNet provide a no compromise, high speed solution using industry standard technologies optimised for use with the Archimedes. A ratio of 4 computers to 1 ClassRom ensures fast application delivery (Impression loads in under 20 seconds into 4 machines) whilst at the same time ClassNet is used for shared printing and file server access.



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Talking to other networks - bridges and gateways

For optimum performance, a large number of computers should be organised into several small networks to reduce network traffic. However, it is important that data can be passed between these networks. Information can be passed between similar types of network via a bridge. Each bridge knows how the different networks are joined together. Whenever one computer sends information to another, the bridges pass on the information only to those computers which require it. Bridges are used to interconnect ClassNet networks. A gateway enables different types of network to communicate by translating the information as well as managing the routing. A ClassNet/Econet gateway allows BBC computers on Econet to access Archimedes file servers on ClassNet and vice versa. ClassNet bridges and gateways are pieces of software running on a computer which is connected to both networks. They are shown explicitly on the diagram for reasons of clarity.

Network Manager's room

We recommend that where file servers need to be accessed from anywhere within the school network, they should be directly connected to the backbone. This minimizes the number of bridges which need to be crossed and improves performance. File servers, as well as providing shared access to hard discs for users' data, can also make available other central resources, such as Teletext, Fax and electronic mail. A tape backup system in the Network Manager's room can backup any hard disc anywhere on the network. Similarly, all management of ClassRom hard discs can be performed remotely from here.

It's a Classic

Oak Solutions combines the power and ease of use of several well-known Archimedes packages to produce two Classic Collections.

One of the most important aspects of the Archimedes is the ability for applications to pass information between each other. This means that developers can produce products that do one job very well, knowing that output from their software can be combined within other applications at a later date.

The two Classic Collections from Oak Solutions combine some of the best Archimedes applications in their fields which can act as a starting point for creating a library of software ideal for helping to deliver the curriculum.

Each Classic Collection is available on a stand alone ClassRom or as part of a ClassShare cluster (see elsewhere in this issue for details of ClassRom and ClassShare). The stand alone offer includes a single user licence for the software, the cluster offer includes a cluster licence (up to 4 computers).

Primary

The Primary Classic Collection consists of the following software: StartWrite - a version of EasiWriter from Icon Technology; Junior Database - the simple-to-use database from Iota Software; Genesis Plus - a powerful multimedia authoring tool from Oak Solutions, and DataSweet - a collection of very simple spreadsheet, graphics, and data processing software from Kudlian Software.

The Primary Collection has been designed to offer a range of tools from which children of all abilities will be able to find something of value. Due to the nature of the RISC OS system, data created in one application can be easily moved to any of the others.

Secondary

The Secondary Classic Collection consists of a set of tools which have become standard requirements for all IT activity. EasiWriter is a powerful word processor with graphical import and automatic table creation facilities. PipeDream 4 is a very powerful, easy-to-use spreadsheet application with all the functionality you will ever require. Desktop Database is a simple to use database management system allowing any size of database to be created and graphical analysis of that data to be displayed. Exports can be made to the mailshot system in EasiWriter. Genesis II is the *de facto* standard multimedia authoring system for the Archimedes. It allows text, graphics, animation, sound and Acorn Replay movies to be combined and linked together. The powerful script language allows limitless expansion of the applications created. WorraCad is the most accurate 2D CAD system available on the Archimedes. Technical drawings can be created to an accuracy of 18 significant figures. Drawfiles can be exported for use in other applications.

Classic collections are priced as follows:
Primary Collection - single user £95, cluster licence £261.25
Secondary Collection - single user £145, cluster licence £398.75

Life with the Saxons

Saxon Life, the latest addition to the Foundation range of curriculum based Genesis applications, is aimed at History Key Stage 2.

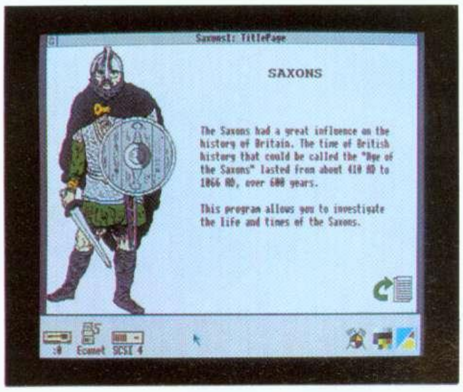
The Saxon Life application is supplied on two discs. The first allows children to follow the story of the Saxon invasion and settlement of Britain from A.D. 400 to 1066, or to take themes, such as Invaders, Kings, Daily Life, Settlements or Religion and to follow these through.

The text is supported throughout by extensive use of maps, diagrams and pictures, making this an exciting and challenging application to use.

Children are not limited to following a pre-determined path. 'Hot text' links enable them to branch out at many points and to make their own investigations.

The second disc contains a database and a set of problems and games.

The Census database can be used to build up a model of the population of a Saxon town.



"The text is supported throughout by extensive use of maps, diagrams and pictures, making this an exciting and challenging application to use."

History Key Stage 2

The problems and games include a Saxon board game, Taefl, and three simulations, Village Site, Burh Location and Bretwalda.

In these, children work in groups to understand and solve the problems faced by the Saxons in finding places to live, establishing towns and finally in uniting into a single kingdom.

These applications are supported by a large pack of photocopiable paper resources. These contain activities suitable for a wide range of age and ability. The activities are based on the material in the applications but do not require the full-time use of the computer. Several groups can be working on their own projects at the same time.

Saxon Life costs £50.00, and the price includes a site licence.

multimedia in the primary classroom

Tony Holdstock is a Primary Advisory Teacher for IT in Leeds. He has developed a number of multimedia, curriculum-based applications using Genesis over the last two years. Much of his work has taken place inside schools.

Here he reports on his experiences.

Multimedia is the use of a number of different types of information - text, graphics, photographs, animations, film, sound etc. - to enhance the impact, appeal, diversity, information content and thereby the educational effectiveness of computer screens.

To produce a multimedia presentation in a real primary classroom might seem a daunting undertaking. Using Genesis Plus, I have worked with children as young as Year 2 to make records of their field trips.

Year 2 of Kippax North Junior and Infant School in Leeds went on a day trip to the local water treatment plant. On their return, they discussed what they had seen and drew pictures of the different processes. Using a borrowed hand scanner, we scanned their pictures and saved them as sprites. Some children used Paint to add colour to their scans.

I then set up what was to be our standard Genesis page with three frames, a title, a picture frame and a text frame. Finally I added a 'Next' frame from the GenLib folder. This page was then copied to make a screen for each of the treatment processes.

The next stage was to drop a scanned sprite onto each picture frame and to agree with the children what the title and text should say. With children of this age, I find it helpful to act as the 'secretary', typing in what they want to say, but leaving them editorial control if they don't like the first draft.

Year 4's visit to the parish church at Howarth was based on the same idea of a standardised screen. They were taken on a tour, and came back to school wanting to reproduce this with the computer.

Responsibility for each screen was taken by one or two children. This time however the children scanned their own photographs as well as their field sketches. Some children preferred to work directly in Draw. They also entered their own text and proved to be efficient editors of each others' work.

An extra dimension was added to the page about the church organ by dropping one of the Maestro files supplied on the Applications disc onto the picture on that page. A double-click now plays a short piece of organ music.

At Lawrence Oates Middle School, also in Leeds, I worked with a Year 6 class on a local nature trail. I set up a framework of linked pages corresponding to stops on the trail. Again the children scanned their field sketches and entered and edited text. One of the class is handicapped, so that writing and drawing are difficult for him. He is very observant however, and he and I discussed in detail the movements of sticklebacks and a waterwheel. I used Tween to produce the animations that David described, and the pleasure and status with the other children that he experienced made the time involved well worthwhile.

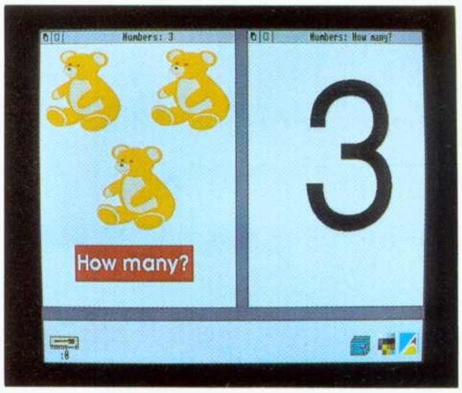
All the projects I have described were carried out using an A3000. The only hardware addition was a hand scanner borrowed from our Education IT Centre. As well as Genesis Plus itself, the software involved was Paint and Draw for pictures, Maestro for music and Tween for animation of drawfiles.

I have also experimented with producing a 'talking book' controlled by a Concept Keyboard. I used Oak Recorder, a microphone which plugs into the printer port and is supplied with its own software to record real speech for each page. The sound samples can be saved in the usual way, then dropped into frames on a Genesis page. This frame can already hold text or a picture.

The page has a 'loudspeaker' picture and 'forward' and 'back' arrows which are links to the next and previous pages. Installing the Genesis ConKeyRM module makes it possible to activate these frames by pressing the appropriate area of the Concept Keyboard.

Recording sound in the classroom - children's own voices for example - is simple using Oak Recorder. Within minutes, primary children can make and save their own sound samples.

The amount of sampled sound that can be stored on a floppy disc is limited. With the arrival of CD ROM however, horizons are widening rapidly. NCET are funding a project to evaluate the use of CD audio with computers. One part of this is a Genesis version of *Goldilocks and the Three Bears*, designed for use with children at Key Stage 1. Each page has frames which let the user hear part of the story. On many pages there are on-screen activities. Again these are described and explained orally. The use of the CD ROM means that a much larger amount of speech is available.



All Oak CD ROM drives are supplied with a Genesis Plus application which can control the CD.

Acorn's Replay will soon make full screen moving video available from within a program. As soon as Replay becomes generally available, a version of Genesis with appropriate modules added will be released.



Multimedia in a primary classroom is a real possibility using Genesis. Pictures, text and sound are only beginnings - Concept Keyboard, CD ROM and moving video are here now and can greatly extend the power and accessibility of the software.

Multimedia applications are available now. More, including some suitable for children from nursery age up, are about to be published.

Multimedia applications can be produced in the primary classroom. Pictures, text and sound can be produced with the children and integrated using Genesis.

Suggested software :
Genesis Plus, Draw, Paint, Edit, Maestro, Tween
Additional hardware :
Concept Keyboard, Oak Recorder, Scanner, CD ROM

Multi-media applications suitable for primary use available now :
Ancient Egypt, Saxons, Castle Life

Genesis II

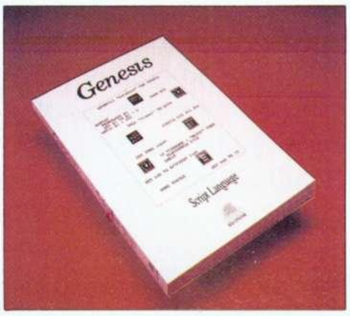
£129.95



The Genesis family of products represent the de-facto standard in multi-media on the Archimedes. Genesis II is the most powerful application in the range, provides all the facilities of Genesis Plus, as well as a comprehensive scripting language which allows even non-technical users to generate their own powerful desktop applications. The script language has the power to control CDROMs and LaserVision players, and can be driven by devices such as Concept Keyboards for special applications. The language can be extended by compiling external modules using the ABC compiler. Upgrades are available to existing users of Genesis and Genesis Plus (including Learning Curve).

£14.95

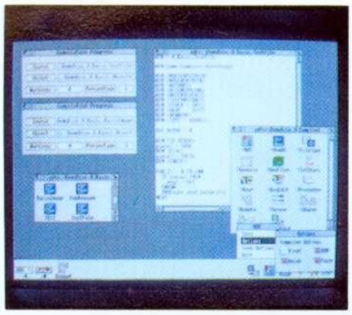
Genesis Script Language Book



The basic use of the Genesis Script Language is covered in the Genesis II manual, but to get the most out of the language and to explore its ability to manipulate lists and databases, to create dialogue boxes and menus and a whole host of more advanced functions, the Genesis Script Language book provides an essential reference work. The book contains a full description each of the 300+ script keywords in its reference section and has chapters on each key area within the script language. VAT is NOT charged on this product.

ABC BASIC Compiler version 3

£99.95



The Archimedes BASIC Compiler is the only serious BASIC compiler available for the Archimedes. It is especially suited to the professional user who requires the speed and protection of a compiled language whilst retaining the flexibility of using an interpreted language during the development phase. Compilation under Version 3 takes place as a RISC OS task thereby allowing the machine to be used for other jobs at the same time. Relocatable modules may be created allowing star commands to be implemented, along with library modules which can contain functions and procedures which may be called from any program compiled using ABC, including Genesis II.

£99.95

Cambridge Pascal



The Cambridge Pascal compiler supports a comprehensive version of the Pascal language and includes many extra features such as full string and error handling. Additional extensions allow the use of random access files and provide direct access to the operating system routines including star commands. The compiler runs under the RISC OS desktop and supports conditional compilation, include files and compilation to relocatable modules. Comprehensive error messages and a trace facility ease the development process.A library of procedures and functions is provided to support access to the window manager.

The best in Languages for the Archimedes

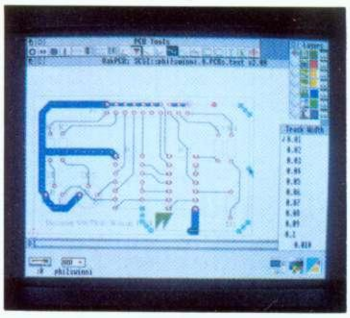
Prices exclude £1.50 p&p and VAT   Telephone for Education Prices

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QUALITY RELIABILITY COMPATIBILITY PERFORMANCE

Oak PCB

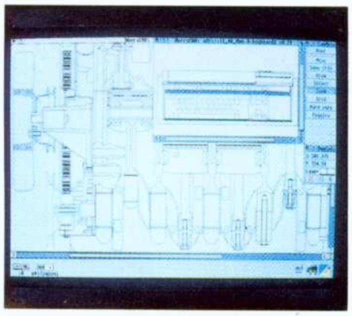
£99.95



Oak PCB is a brand new RISC OS compliant PCB and schematic design package. A multi-tasking desktop user interface based on !Draw ensures that users can quickly exploit the powerful draughting features, and create complex multi-layer circuit boards or schematics. Output is to RISC OS printer drivers, or the plotter driver supplied. Features Drawfile import/export, associative editing, drilling data, solder resist etc. etc. Supplied with comprehensive PCB and Schematic libraries.

WorraCAD

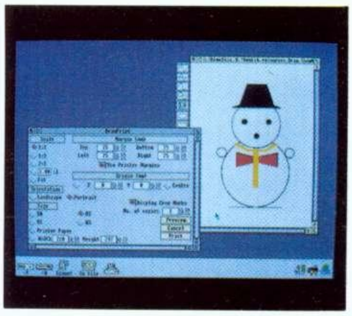
£99.95



WorraCAD is the de-facto standard RISC OS 2D CAD package. Working to 18 significant figures precision, WorraCAD provides all the tools required to produce superb accurate technical drawings. Outputs to plotters and RISC OS printer drivers. Features tangents, normals, intersections, parallels, automatic associative dimensions, grid, Drawfile export, linestyles, 16 layers, hatching, mirroring and stretching, CNC link available to Boxford Lathes. Libraries available seperately.

Draw Print & Plot

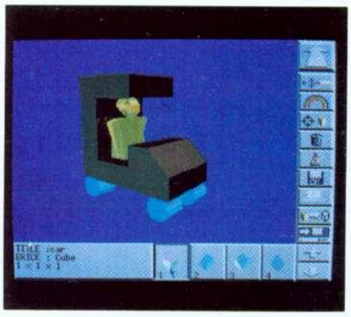
£39.95



Draw Print & Plot supercedes our earlier plotter drivers for Drawfiles (WorraPlot and ArcSign - upgrades available). DrawPlot accepts drawfiles and creates output on HPGL compatible plotters. Features outline fonts, sprites, filled areas, line thickness and depth sorting to avoid colours overlapping. DrawPrint accepts drawfiles and allows them to be printed to RISC OS printer drivers at a different scale - for example to create huge posters (cropmarks are created automatically).

KiddiCAD

£69.95



KiddiCAD is an exciting 3D building block package designed for younger users. 3D models may be created, using the library of building bricks supplied, and rotated in real time. The high speed of operation and the live 3D view allows users to quickly gain an understanding of work in 3D. Models may be output as Spritefiles in colour or wireframe mode, and can then be imported into painting packages, DTP, Genesis etc.

Leaders in CAD for the Archimedes

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COMPATIBILITY PERFORMANCE

The Ace Collection...

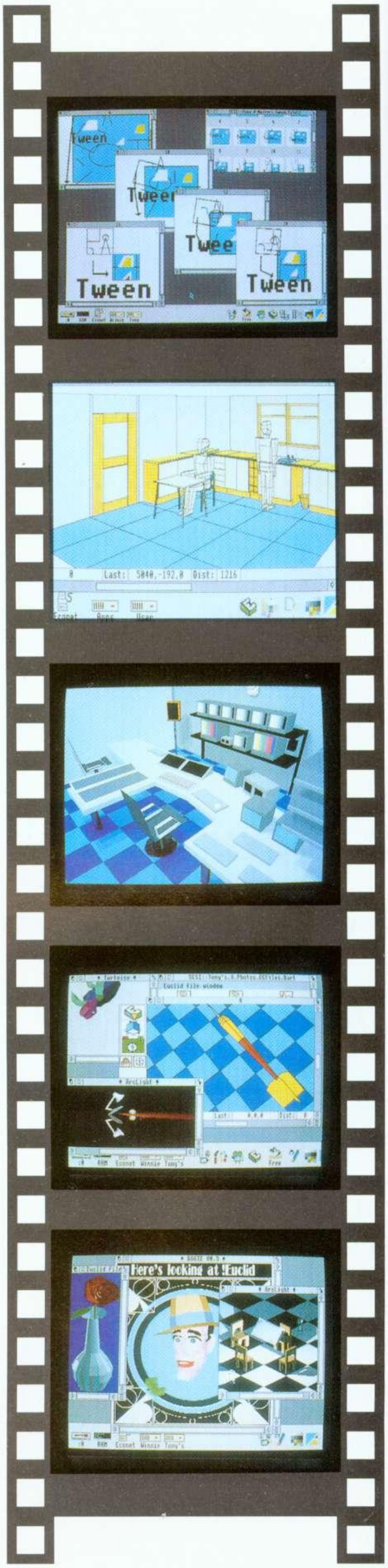
Tween produces realistic animations from Draw files. You provide a starting view and a finishing view and Tween does all the 'inbetweening'. Text and sprites can be included in the movie and all colour changes and text sizes are catered for.

Euclid is the best multi-tasking 3D graphics and animation system available for the Archimedes. Working under the Desktop, Euclid is just like a 3D version of Draw. You can use your 3D images within other products, such as Genesis.

ArcLight is a multi-tasking ray-tracer which will generate a realistic Euclid picture, or a complete Mogul film, while you are free to get on with other work. Different object materials can be specified including mirror and glass.

Mogul makes films from Euclid 3D pictures. Set a camera up and 'fly' it through your image. Key points and positions are recorded and Mogul produces all the intermediate frames. Mogul films are automatically compressed.

Splice allows you to edit films produced by Mogul or Tween. You can even produce hand-drawn cartoons by converting sprites from other sources such as scanners. The films produced can be used in a wide range of Archimedes applications.



...working together

Ace Computing
27 Victoria Road
Cambridge
CB4 3BW
Tel: (0223) 322559
Fax: (0223) 69180

Tween	£34 (ex VAT)
Euclid	£68
ArcLight	£50
Mogul	£24
Splice	£34

SCSI

It's over three years since Oak launched the first SCSI card for the Archimedes. Now that there seem to be a plethora of different SCSI cards on the market, we take a look at what makes the Oak card special.

Oak's decision back in 1989 to go for a SCSI rather than the then popular ST506 type controller quickly proved to be correct. All the world's manufacturers of high speed workstations moved in the same direction, and development of SCSI hard drives gathered pace.

The original design brief was to produce a versatile, reliable SCSI 16 bit controller that would not impede data flow into and out of the Archimedes. It is a measure of how successfully this brief was achieved that the hardware design has remained unchanged since its launch and is now used by many thousands of clients from schools to Formula 1 racing teams.

The issue of speed was critical. No one could predict how fast hard disc drives would become in the future so the card had to be able to get data on and off the SCSI bus as fast as the Archimedes could deal with it. The card, therefore, allows the hard disc to work to the limit of its performance. Some manufacturers now claim impressive data transfer rates, but fail to mention that these speeds are only achieved when transferring data from the cache RAM on one card to cache RAM on another. Figures quoted by Oak always refer to real performance figures achieved when transferring data between Archimedes and hard disc.

Of course, speed isn't everything, and neither, in the world of SCSI, are hard discs. Support for other SCSI peripherals is also key to the success of the Oak card. The card inherently supports other 'disc like' devices such as magneto-optical drives, and was the first card to support partitioning in order to cope with drives larger than the 512Mb limit imposed by Filecore. Comprehensive support for tape backup devices ranging from cassettes to DAT is provided by the versatile OakTape software which allows hard discs, networks, and indeed any filing system, to be backed up and restored on a file by file basis. Filing system support for CD ROM drives is provided by Acorn's CDFS, and support for SCSI scanners is available courtesy of Computer Concepts' Scanlight Professional software.

The Oak SCSI card has always provided support for write protection of drives. The introduction of ClassRom last year refined the protection and management of hard discs to a level where drives can be used in the classroom with no danger of pupils accidentally or maliciously tampering with applications. ClassRom also removes the danger of applications becoming infected with viruses. Additionally, management tools take the pain out of keeping systems up to date. ClassRom is available as a retro-fit EPROM for existing Oak SCSI users.

Users of the Oak SCSI card have access to unsurpassed technical support over the phone in case of difficulties, and are assured of receiving only top quality equipment thanks to Oak's zero-defect manufacturing and test regime. Each card is exhaustively tested and any card which scores less than 100% is rejected, thereby ensuring that only 'perfect' cards are shipped to customers.

RISC OS 3 PRINTING

Make the most of the new printing facilities in RISC OS 3 with Ace Computing's Pro-Drivers

The new printer driver system supplied with RISC OS 3 provides many enhancements over the old-style system. Multiple printers can now be supported and text and First Word Plus files can be spooled and queued.

The boffins at Ace Computing have wasted no time in implementing even more enhancements to the RISC OS 3 system and have just released the Pro-Driver range.

Pro-Drivers offer significant improvements in a number of areas:

A new version of !Printers allows all types of printer to produce professional 'CMYK' colour separations.

A spooler application works with the new !Printers to allow all printing from applications to be spooled and then sent to the printer in the background - thereby returning control of the computer to the user as quickly as possible.

HP colour printers are supported (PaintJet, PaintJet XL, PaintJet XL300 and DeskJet 500C) and the drivers include level 2 data compression.

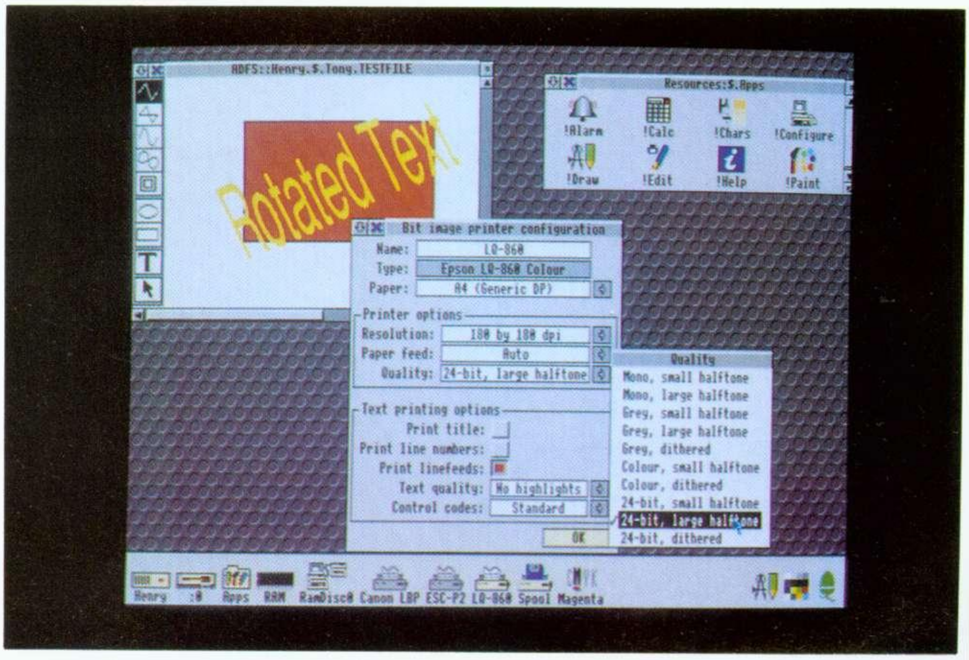
The new Epson ESC-P2 printer standard is supported, again including data compression.

The Canon LBP4 and LBP8 printers are supported, driven via the parallel port (no expensive direct drive card to buy!).

24 bit colour output is available for ANY colour capable printer.

Ace's new Pro-Drivers offer a low cost route to maximising the use of your printers under RISC OS 3. Valuable improvements in performance are available, whatever printers you own.

Pro-drivers are priced from £25 (ex VAT)



Battle of the Somme



The Battle of the Somme is a multimedia presentation concentrating on the events that occurred around the 1st July 1916. The software allows pupils to explore text, sound, graphics, photographs, maps, laservision stills and movie sequences.

The Imperial War Museum have released movie film, photographs and sound recordings for the production of a laservision disc which is available for use with the package.

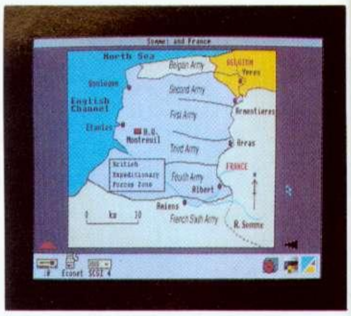
The package was conceived and produced by the Netherhall School in Cambridge with support from the NCET. It was authored using Genesis II and is focussed on cross-curricular resources with worksheets supporting its use in History, English, Maths, Geography, Music and Art.



A letters section contains postcards sent back from the trenches by one soldier during 1915 and 1916 which provide an excellent stimulus to written work in the classroom.

A calendar provides easy cross-referencing and fast access to specific events allowing the user to dip into dates between 1914 and 1916.

A Roll of Honour database lists all soldiers in the Cambridge Battalion killed on 1st July 1916. This data can easily be amended to contain information more appropriate to different regions. These lists provide good stimulus for activities in Geography and Mathematics classes as well as History.



The application contains songs that were sung to entertain the soldiers. The tunes may be played using the computer's sound system, or a rendition by a male voice choir can be heard via the laservision disc.

A set of maps allows access to information relating to specific areas - starting with a view of Europe and zooming right in to the front lines. A Concept Keyboard may be used at this stage as an alternative to the mouse.

Digitised still images, and those from the laservision disc may be accessed and these provide a wide range of images related to the battle.



Audio tracks on the laservision disc allow the user to listen to interviews with a variety of survivors of the Somme, and the forty minutes of movie film have been segmented into short clips related to other materials in the package.

A textbook section provides important factual background to the events which took place. Selections include Women at War, Propaganda, The Air War and Joining Up.

The ultimate multimedia experience

Software site licence £95.00   Software site licence including Laservision disc £145.00   Laservision Disc £100.00

Prices exclude £2.00 p&p and VAT

Access VISA

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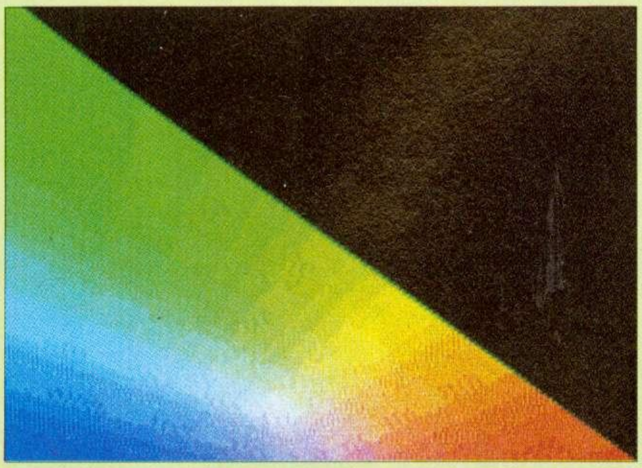
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QUALITY   RELIABILITY   COMPATIBILITY   PERFORMANCE

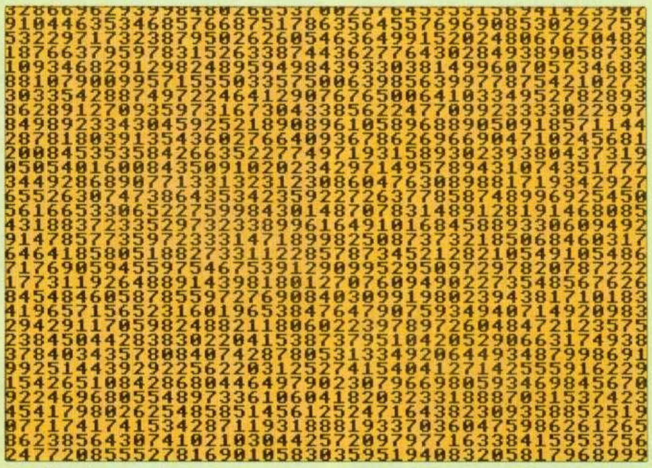
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PROGRAMS

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*INFO includes a host of intriguing graphics routines, and features a fully configurable boot program that allows you to customise your desktop



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TWO IN THE HAND

Hand-held scanners can be good value for money. Ian Burley compares two leading products



Original art work for scanning

If there's an area the Archimedes has really excelled in, it has to be desktop publishing (DTP). Image scanning goes hand in hand with DTP and, consequently, the range of image scanning devices on offer to Archimedes users is unsurprisingly large.

This month we look at two of the main contenders in the Archimedes hand-held monochrome scanning stakes; Scanlight 256 from Computer Concepts and Scan 256 from Watford Electronics.

WHO NEEDS IT?

If you have access to a half-decent printer like a 300dpi ink-jet or laser printer, it's really not at all difficult to produce leaflets and pamphlets with very good scanned-in illustrations, almost up to the quality you find in the daily newspapers. The latest 600dpi lasers from Computer Concepts and Calligraph are capable of even better results. However, even these printers hold back the ultimate reproduction quality of a decent scanned image, which can only be revealed when printed professionally. But that's exactly what hundreds of Archimedes users are already doing anyway.

You don't even need a DTP package, as most of the better Archimedes word processors can incorporate scanned images or 'sprites' into their documents. Image scanning is also a very useful way of sourcing illustrations for multimedia databases, art packages and 3D rendering programs. If you have a fax facility like Computer Concepts' FaxPack you can give your faxes that personal touch by scanning in your own logo. There are endless other uses for scanners.

THE HARDWARE

Professional publishers almost universally rely on high-resolution flat-bed scanners to grab images like photographs and pre-printed line art. The cost of flat-bed scanners is falling quite fast but, for most cost-conscious non-professionals, the only choice remains a hand-scanner. One wag recently pointed out a job for a hand scanner that even the best flat-bed would find difficult to accomplish; recording the labels on a precious collection of vintage wine bottles!

Hand-scanners have improved considerably over the years, and units capable of recording colour images are now available, although they are relatively expensive and are arguably of limited use compared to the monochrome types examined in this article.

The very earliest hand-scanners were derivatives of hand-held bar-code readers used in shop check-outs. A coloured light, usually red, was reflected off the code and sensed by a CCD (charge coupled device) chip. Versions for the computer market added a wheeled mechanism to detect the scanning motion of the unit as it was manually drawn across the art work. These early scanners were limited to around 200dpi with a



Watford's unit offers a faster scan but is more 'contrasty'

maximum of 16 grey scales. These days the best affordable monochrome hand scanners offer 400dpi maximum resolution and up to 256 grey scales, which is adequate for professional quality reproduction. Green has now replaced red as the most common scanner light source.

Both of the scanner units reviewed are green-light devices offering 100 to 400dpi resolution in steps of 100dpi, and switchable to 256 grey scales as well as momochrome for line art. The Computer Concepts' Marstek Matador is sourced from Taiwan while Watford Electronics' scanner is Japanese. Both scanners appear to share some identical parts, though the external casings differ in style slightly. They both appear to be identical in the quality of construction. Each unit requires a special interface card to connect to your Archimedes.

Each card has its own particular advantages. The CC one can be software-driven to adapt to different types of scanner head. Original customers have had the comfort of knowing that if a super-duper new scanner came out there would be a chance that CC could rewrite the device driver to make it compatible with the same interface card.

The Watford arrangement is designed for speed. It's certainly noticeable that you can move the scanner head more quickly and comfortably during a scan than the CC one. The Watford card is dedicated to the one scanner mechanism, which I'd consider to be a disadvantage, as both units are capable of producing more than adequate results.

IMAGE PROCESSING

Just as important as the hardware is the accompanying software. Raw scanned images will often require cropping, rotating, alterations to contrast and brightness plus image enhancement like sharpening, softening and filtering. The software supplied by both CC and Watford supports all the usual image manipulation and enhancement facilities you'd expect, plus more.

Computer Concepts has now standardised on the latest version of the software that was originally developed for the Scanlight Professional flat-bed scanner. The user simply chooses which scanner and interface is required, and the correct device driver is loaded. I was able to use exactly the same software to scan images from both CC's Canon SCSI flat-bed scanner as from the Matador hand-held. Not every feature is available to the hand-scanner user; the useful 'photocopy' function available to LaserDirect printer users who have flat-bed scanners does not seem to work with the hand-scanner.

While the same essential software facilities are featured in both scanner packages, they differ in some basic respects. Both offer 'before' and 'after' processing displays of the currently loaded image. The Scanlight software defaults to a mode which generates the modified image display on the screen in real time.

This saves a lot of memory, which means Scanlight is a viable proposition on a 2Mb Archimedes, even when dealing with quite large scanned images. The drawback is that, though it is very fast considering the data processing being carried, screen updating can be a bit slow. A memory cache option speeds things up considerably, but uses up more memory. Remember that original images can be well on the way to 2Mb in 400dpi/256 grey scale mode.

The Watford software uses a multiple buffer system, which allows several processed versions of the same original image to be displayed at once. One buffer can contain the resulting processed image generated from a previously processed image, leaving the original untouched. Compared to the CC software, which only offers a single comparison with the original, the Watford software can show several comparisons and this convenience could mean less time fiddling to get the image just right. However, you really need the full complement of 4Mb of Ram to make the most of this feature.



The Scanlight 256: good image processing software



By contrast, the Scanlight Professional flat-bed scan

Scanlight now supports the relatively new Acorn 256 greyscale sprite format. Currently there are a lot of software packages which will display these sprites in a splash of strange false colours, but applications like *Impression*, *Ovation DTP* and the latest Risc OS 3 versions of *Draw* and *Paint* now recognise 256 greyscale sprites in 16-colour screen modes correctly.

Watford's review software could not save sprites in the new format, although this will be corrected. Although it does offer alternative file formats such as Aim and Tiff, I was surprised to find that *Draw* format files could not be saved directly.

HOW THEY COMPARE

	WATFORD 256	SCANLIGHT 256
Price	£185	£199
Scanning width	105mm	105mm
Max grey scales	256	256
Acorn 256 grey sprites	Not yet	Yes
Max resolution	400dpi	400dpi
Scan illumination colour	Green	Green
Scanning speed	Medium	Slow
Multiple image buffers	Yes	No
Image rotation	Risc OS 3 only	Yes
True brightness/contrast	Yes	Yes
Sharpening	Yes	Yes
Edge detection	Yes	Yes

COMPARISONS

The Watford Scan 256 and CC Scanlight 256 were compared with each other, alongside a flat-bed Scanlight Professional Canon unit. All scans were at 300dpi in 256 grey scale mode. As all the scanners are based on green light CCD sensors, they all had problems with the colours on the subject's jacket. All the unmodified original scans, as reproduced here, had trouble differentiating the turquoise and red sections of the jacket. Considerable contrast adjustment could fix this, but only at the expense of other parts of the picture.

The Scanlight Matador unit's brightness was set to its middle position. To get a comparable picture on the Watford scanner meant turning up the brightness well past the middle position. The Canon flat-bed doesn't have a brightness control and its resulting image was a bit dark.

Overall there wasn't a great deal to choose between the two hand held units. The Watford unit was a touch more contrasty and it was less difficult to scan images as you can move the unit more quickly than the Matador without inducing a speed warning. The Canon flat-bed was arguably very slightly sharper, which is only to be expected considering the extra cost and sophistication.

I preferred Scanlight's software. It includes the provision of 'handles' on the grey scale map for easy and direct mouse-adjustment, plus a fast image rotation function – the Watford software requires Risc OS 3 for this. Watford, however, supplies endless utilities for those very keen on the finer details of image enhancement. Ideally, I'd prefer to run the Scanlight software with the Watford hardware.

PRODUCT DETAILS

Product: Watford Scan 256
Supplier: Watford Electronics, 250 Lower High Street, Watford WD1 2AN
Telephone: (0923) 237774
Price: £185 excluding VAT

Product: Scanlight 256
Supplier: Computer Concepts Ltd, Gaddesden Place, Hemel Hempstead, Herts HP2 6EX
Telephone: (0442) 63933
Price: £199 excluding VAT

ACORN USER

PROGRAMS

The section that is packed full of programs for you to use

Your calculator can tell you what 99^{3400} is, and your Archimedes can too. But with Nick Craig Woods' *Numbers* module on page 111 of *BAU*, you can start thinking really BIG! Like, the sort of numbers that are involved in calculating the number of stars in the universe, or the number of atoms in your head.

Nick primarily designed his calculator to find prime numbers, which it does with great finesse, and before long your Archimedes is churning out the sort of numbers that have taken years to find. Numbers can be fascinating, so turn to Nicks article and immerse yourself in numeric heaven.

After you've descended from infinity, then try a casual cruise through our user-friendly *INFO. This month resident Data DJs, Dave and Dave, take you through the new pressings, and present a few mixes of their own.

Coming in at number seven, regular groover Jan Vibe, creator of wacky patterns, presents a double-sided trip into psychedelia. *Eggs* and *Eye* wouldn't look out of place on the background of the latest videos – all we need now is the music!

Idol talk is no thing to do, program popsters, and entering the *INFO chart at no six is the Daves' utility to get you networkers networking your thoughts. Now you can talk to each other over your wires, with no chance of them getting crossed. Another cruise into colours at number five presents *CIE*, an attempt to show all of the colours that the Arc can produce, in one simple diagram.

At number four, your eight-bit's screen is doing the new dance craze, the raspberry ripple. Type in this one, and watch that screen jive! For regular techies, some fast mathematics hops in at number three, and at number two a new fringing effects demo gets your eyes popping. And at number one this month we have *Auto*, the utility that helps you change your desktop environment. We're not just offering new entries, but our independent chart provides us with remixes, including a new version of eight-bit *Waterworld*, and a correction to the *Uptime* utility from the April 1992 chart. To work your way into the *INFO chart, send your submissions to, *INFO, BBC Acorn User, 101 Bayham Street, London, NW1 0AG.

David Radford's sound series has come to an end now, but this month Richard Garrett, musical expert, tries out David's routines, and creates a virtual orchestra in his living room. Read his article on page 122, and learn exactly how to synthesise the sounds of your favourite instruments.

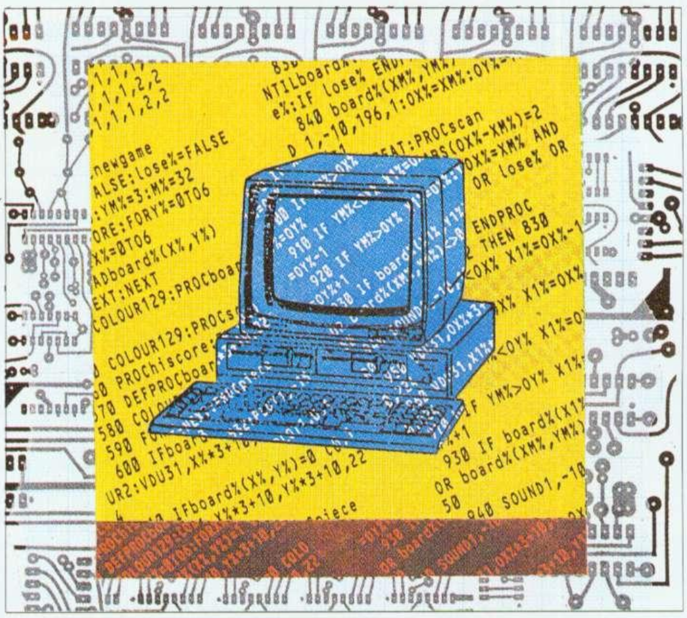
Those of your following our guide to the inside of your 32-bit machine, turn to page 125, where you'll learn all about simple arrays, and then how to sort a block of data, all in machine code.

If some of the words in *BAU* leave you feeling confused, then you need our A to Z of computer jargon. Our resident beginner, Sarah Burns, explains some of the jargon associated with the computing world. If you've just picked up *BAU*, or a computer, then this is the place to start.

Arachnophobes should look out for pages 132 and 133, where our hairy friends are spinning their webs with the help of Mat Tizard. Mat uses the spiders' webs to show how natural selections has perfected today's web. Electronic flies buzzing around the screen test out each generation of web, and the fattest spider lives to tell his sons and daughters how he built it. Turn to page 132 to read about how we can simulate evolution on our computers.

Finally, the yellow pages offer you the chance to copy in these programs. The *Numbers* module however is only available to subscribers and is found on the monthly disc.

Paul James



CONTENTS

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systems & silicon

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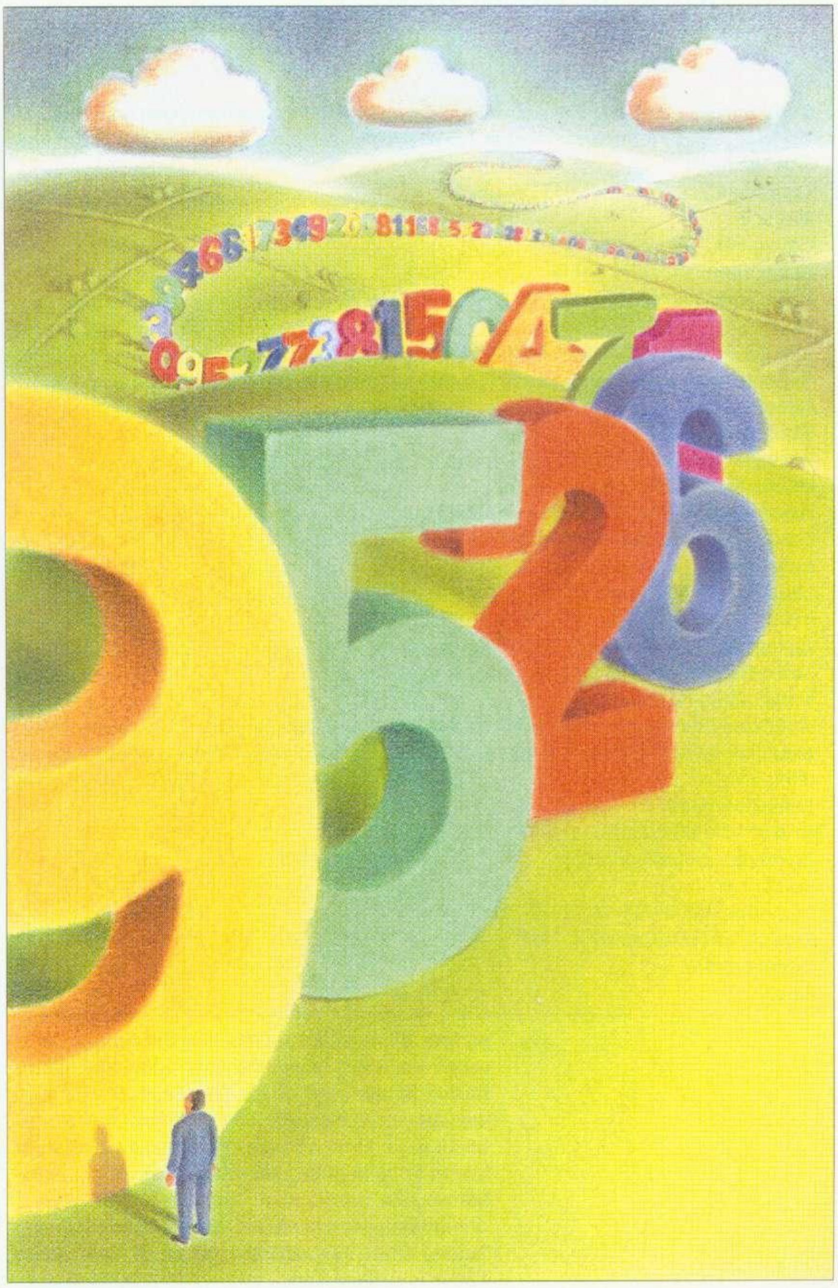
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THINKING BIG

To solve problems at the leading edge of mathematics, you need to be able to handle really big numbers. Nick Craig-Wood explains how it is done on the Arc



Numbers with lots and lots of digits have fascinated people ever since the decimal number system was invented. In a famous problem that the mathematician Archimedes posed to Eratosthenes, one of the answers was a number of over 200,000 decimal digits. So both of them would have been quite at home with my big-number program, *Numbers*.

Numbers allows you to calculate with numbers as big as the memory in your computer. However, before you rush off to calculate π to a million places, remember that the routines only deal with whole numbers (integers). Later I will explain how to simulate fixed point arithmetic. This makes the module ideal for number theory, and for RSA public key encryption.

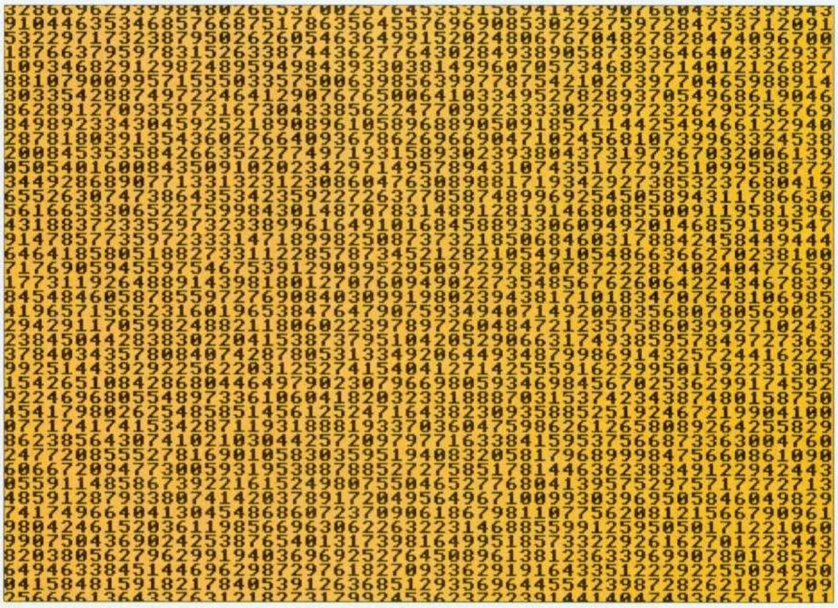
The *NumCalc* program puts a friendly face on the *Numbers* module, enabling you to use it like a calculator (albeit with a few more digits than usual). It acts as an expression evaluator, similar to a more modern calculator. It enables you to enter expressions in normal notation and it will calculate then for you. It has 26 variables (A-Z) and holds the result of the last calculation in variable @. If you enter a '?' the program will print out some help.

You can type in upper or lower case, *NumCalc* doesn't care. So have a go! Type in an expression as you would in Basic and it will be calculated for you. Remember to load the *Numbers* module (by double clicking on it) before running the program.

EASY TO USE

You can see how easy *NumCalc* is to use if you take a look at the three examples in the box overleaf. *NumCalc* has some operators that Basic does not. These are '!' for taking factorials (N! = 1×2×3 . . . (N-1)×N so 3! will give the reply 6) and '%' which works the same as the Basic MOD operator. The functions rnd(a), probablyprime(a), gcd(a,b), smallfactor(a), sqr(a), powmod(a,b,c) are also provided and these are described in the help. ESCAPE will interrupt any calculation that is taking too long, and SHIFT-ESCAPE will exit you from *NumCalc*.

After I decided to write these routines in Arm code, a module seemed the most logical way to



Approximately the number of ways to arrange the paintings in the Paris Louvre

USING NUMCALC

- As a simple calculator. The last example shows how to simulate fixed point arithmetic. The large number is the square root of 2 to 50 decimal places, if a decimal point is placed just after the first 1.

Expression: 2+2
Result: 4
Expression: 2^64
Result: 18446744073709551616
Expression: sqr(2*10^100)
Result:
141421356237309504880168872420969807856967187537694

- For symbolic algebra, including how to solve a large quadratic equation:

Expression: a=1
Result: 1
Expression: b=-456579579579588
Result: -456579579579588
Expression: c=56200344488577628484340195
Result: 56200344488577628484340195
Expression:
(-b-sqr(b^2-4*a*c))/(2*a)
Result: 123123123123
Expression:
(-b+sqr(b^2-4*a*c))/(2*a)
Result: 456456456456465

- An investigation into whether 2^{67}-1 is prime or not. (Incidentally, the factors shown were completed by hand by Frederick Cole in 1903 – he said it had taken him 20 years of Sunday afternoons)

Expression: p=2^67-1
Result: 147573952589676412927
Expression: probablyprime(p)
Result: 0
Expression: 193707721*761838257287
Result: 147573952589676412927
Expression: @-p
Result: 0

present them. This means that the routines are called as SWIs using the SYS command from Basic. At the core of the *Numbers* module are the memory management routines based on OS_Heap. These enable numbers of variable length to be kept in a reusable piece of memory, known as a 'heap'.

Numbers stored on the heap (referred to as 'nums' from now on) are stored in two parts. There is a head and a tail. The head is fixed, and when a pointer to a num is referred to, it is actually a pointer to a head.

The head points to the tail of the number. This is where the actual digits of the num are held, in binary, and this may move and expand or contract as operations are performed on the num. The head also contains information about how long the number is, and what its sign is and some other housekeeping details. Have a look at the diagram to see how a typical num is stored in the heap.

The module uses straightforward techniques like those we were taught at school to do calculations. That covers add, subtract and multiply. Dividing is a more difficult process, because the computer cannot guess what the next digit of the answer is. When we do long division we only have to guess from one of 10 digits (base 10). However, the most efficient way to hold numbers in the Arm uses numbers in base 2^{32} – 4,294,967,296, which is too many to guess one digit from! A more sophisticated method is used, which approximates the next digit by looking at the quotient, and then makes sure that the sum was correct.

To use the module it is necessary to set some workspace aside for it to use as a heap for the numbers. Here is how a program to use *Numbers* might start:

```
*RMEnsure Numbers 0.0 Error 1 Numbers
module not found
HeapSize=64*1024
DIM Numbers HeapSize
SYS "Num_HeapInit",Numbers,HeapSize TO
hp%,zero%,one%,two%
```

This makes a heap for the numbers and gets hp%, which is a pointer to the heap variables, (this is needed by some of the SWIs): zero%, one% & two% are pointers to numbers which have the preset values 0, 1 and 2, for convenience and internal use.

BASIC FUNCTIONS

All nums must be initialised before use. What this does is make a head in the heap and sets the tail to zero. So the following would make some variables, called a%,b%,c%.

```
SYS "Num_Init",hp% TO a%
SYS "Num_Init",hp% TO b%
SYS "Num_Init",hp% TO c%
```

In order to set a num to an integer (or a Basic variable in the range $\pm 2^{31}$) you would use:

```
SYS "Num_Set",a%,12345
```

The following would input a string and convert it to a num pointed to by a%:

```
SYS "Num_Input",a% TO flag%
IF flag%=0 THEN PRINT "Number was bad"
```

Number's SWIs always take their arguments before their results, so:

```
SYS "Num_Mul",a%,b%,c%
```

This does c%=a%*b% or, more mathematically, a%*b%Îc%. Num_Add and Num_Sub work in exactly the same way. Num_Div is slightly more complicated, returning the remainder (modulus) as well as the result (quotient). So:

```
SYS "Num_Div",u%,v%,q%,r%
```

does (in an equivalent Basic statement) q%=u% DIV v% and r%=u% MOD v%. To print out a% use:

```
SYS "Num_Print",a%
```

That covers the basic operators. Intermediate in complexity come the following . . .
To return the sign of (a%-b%):
SYS "Num_Cmp",a%,b% TO sign%
so, say you want to have a statement of the form IF a% > b% THEN . . ., you would do it by:
SYS "Num_Cmp",a%,b% TO sign%
IF sign% > 0 THEN . . .
You could substitute any of <,<=,>=,=,<> for the > in the statement above. If you want to make local variables for PROCs and FNs this can be done with:

```
DEF PROCdo_something
LOCAL local_variable%
SYS "Num_Init",hp% TO local_variable%
REM Rest of PROC
SYS "Num_Remove",local_variable%
ENDPROC
```

You should not set num a% to num b% by b%=a%. It will work, but the head and tail of b% will be left in the heap using up room, so use one of the following instead:
SYS "Num_Swap",a%,b% Swaps the value of a% and b%
SYS "Num_Move",a%,b% Moves the value of a% into b%

ADVANCED FUNCTIONS

Here is a brief description of some of the functions which are useful for things like finding large prime numbers, RSA cryptography or number theory:
SYS "Num_Gcd",a%,b%,c% Finds the greatest common divisor of a% and b% into c%
SYS "Num_Pow",a%,b%,c% Finds a%^b% into c%
SYS "Num_PowMod",a%,b%,c%,d% Finds a%^b% MOD c% into d%
SYS "Num_Inv",a%,b%,c%,d% Finds c% & d% such that a%*c% MOD b%=d% AND d%=GCD(a%,b%)
SYS "Num_ProbablyPrime",a% TO f% Returns f%=0 if a% is not prime, f%=1 if a% is prime (with a probability of 0.25 of being wrong)

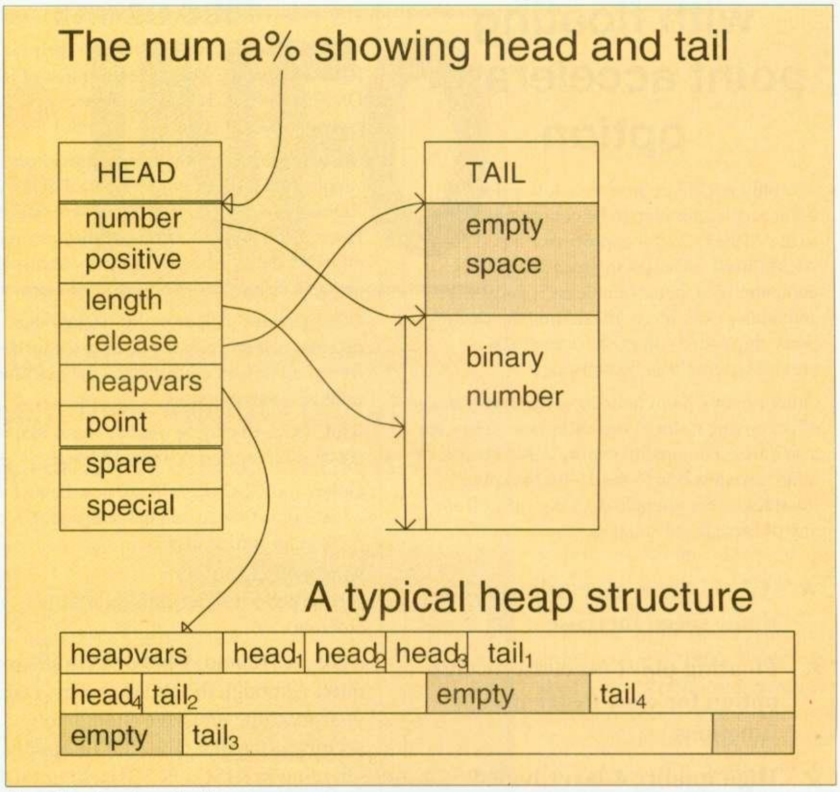
It is worth explaining more about Num_ProbablyPrime. This is for testing whether a number is prime or not. If you use it once and it returns a 0 then your number is not prime. However, if it returns 1 then your number might be prime (three chances out of four). Every time Num_ProbablyPrime is run, it is different, so that if you use it twice and both answers were 1 then you have a prime with a probability of 15 chances out of 16.

So, to 'prove' a number prime to a given probability, run the routine lots of times. If you run it N times, and each time the result was 1 then you have a prime to a probability of $1:4^{-N}$. So if you run the routine 50 times with answer 1 you can be sure the number you had was prime (the chances of a cosmic ray particle changing the state of a bit in one of your Ram chips is higher), although many mathematicians would not call that a real proof.

Using Num_ProbablyPrime is much quicker than proving the number prime. For a number of N digits, Num_ProbablyPrime takes a time proportional to N^3, however the quickest routine to prove the number prime takes time proportional to N^5, so for 100-digit numbers it would take around 10,000 times longer.

On the monthly disk you will find *Numbers* (the module), *NumCalc* (the calculator), *Lucas* (to find Mersenne primes), *NumModTxt* (documentation on all *Number*'s SWIs) and *RSA* (a demonstration of public key encryption).

Number theory was once thought to be the least productive area of maths. In recent times that has changed, and it has become the key to many different types of encryption techniques, secure verification, error correcting codes and others. Karl Gauss said, 'Mathematics is the queen of the sciences and number theory the queen of mathematics' and with that sentiment, may you be speeded on the way to the heights of mathematics by *Numbers* and *NumCalc*.



How Numbers handles heaps

PRIME PROPERTY

A prime is a number which is divisible by only 1 and itself without remainder. A Mersenne prime is a prime of the form 2^p-1, usually denoted M_p. The world's largest known prime is a Mersenne prime, which may well be known to readers of *BAU* since, in June 1991, Dr Susan Stepney wrote an article with a program to calculate the numbers in question and determine their primality.

The program by Dr Stepney was re-written using the *Numbers* module (*Lucas*, on the disk). This has two major advantages. First, the calculation done with the large numbers is done by the *Numbers* module and hidden from sight, making the program easier to understand. Second, the calculations in the module are done in machine code and run an awful lot faster. To show that M_{397} is not prime takes three¼ hours with Dr Stepney's program, but using the *Numbers* module it takes five seconds. The program will discover that M_{521} is prime in 12 seconds. If you leave the program running for about a week it will discover all the Mersenne primes up to M_{4423}.

M_{216091} is (probably!) the largest prime known at the current moment. If you increase the HeapSize to 512*1024 in the *NumCalc* program and enter 2^216091-1 into it, it will show you the number in a few minutes. To check that it is a prime would take about five years on an A5000! Here are a few primes which I have discovered (though not necessarily for the first time) with *Numbers*:- $2^{4423}-1$, 340!+1, 111 . . . 111 (1031 occurrences of the digit '1'; a number of this form is called a rep-unit), $10^{100}+267$, $10^{1000}+453$.

*INFO

Dave Lawrence and Dave Acton present their monthly mix of programs for all Acorn users

STAR PROGRAM

AUTO

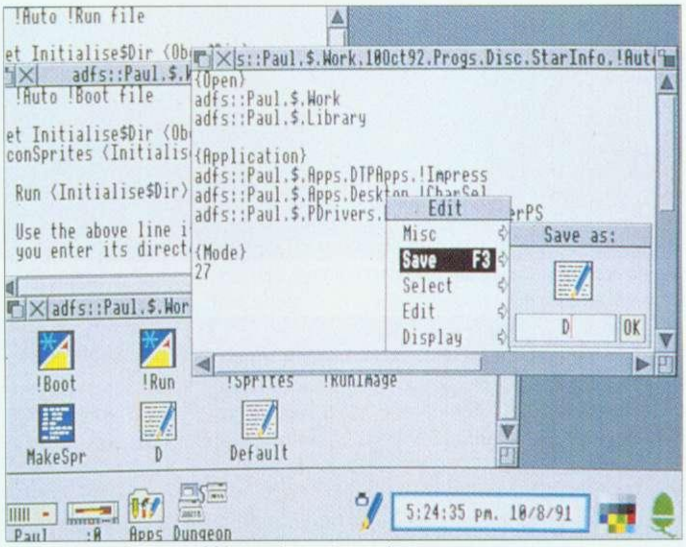
Program: Auto (!RunImage, MakeSpr)
Purpose: Desktop utility
Author: Andrew Young
Machine: 32-bit
Listings: Both 70 lines Basic

This very short and neat desktop utility should prove valuable to many readers. It's designed to set up your desktop environment appropriate to your current activity.

Very often, you need certain applications loaded, certain directories displayed, and even a specific screen mode selected for a particular task. For example, you might want *Impression* and *Edit* installed with adfs::MyDisc.$.WP opened and screen mode 17. These requirements can be saved as a simple text file within *Auto*. The text file is given a single letter name that is the same as the 'hot key' you want to use to install the environment (for example, W for word processing). Simply double-click on *Auto* while holding down W and your machine sets itself up.

FIGURE ONE: What you need to get *Auto* started. (Lines are separated with a ¶).

!Boot:
Set Initialise$Dir <Obey$Dir>¶
IconSprites
<Initialise$Dir>.!Sprites¶
| Run
<Initialise$Dir>.!RunImage¶
!Run:
Set Initialise$Dir <Obey$Dir>¶
IconSprites
<Initialise$Dir>.!Sprites¶
WimpSlot -min 32k -max 32k¶
Run <Initialise$Dir>.
!RunImage¶



Set up this collection of files and Auto is ready to go

To use *Auto* first create this directory and then enter and save the *!RunImage* program inside it. Next enter and run *MakeSpr* which will create the file *Sprites*. Put *Sprites* in the directory too. Now enter the *Boot* and *Run* files, as shown in Figure One. These should be obey files – use *Edit* to create them. If you would like *Auto* to be run automatically by the desktop remove the '|' (vertical stroke) character from the last line of *!Boot*. Finally create an empty text file called *Default* and save this in *Auto* too. Use *Edit* for this or use *Create Default then *SetType Default Text.

FIGURE 2: An example of an *Auto* configuration file:

{Open}¶
adfs::HardDisc4.$.Apps.RiscOS
adfs::HardDisc4.$.Data.MyDocs
{Close}
adfs::HardDisc4.$
{VDU}
2,1,27,1,67,1,70,3
{Module}
BasicEdit
NewModes
{Application}
adfs::HardDisc4.$.Apps.RiscOS-.!Edit
adfs::HardDisc4.$.Apps.Documents.1stWord+.!1stWord+
{Mode}
28

Each configuration file is just a text file containing special keywords followed by one or more parameters. The valid keywords are as follows: {Open} precedes one or more

HINTS AND TIPS

- James Bossard offers an easy way to get tiny but readable print on your Epson-compatible printer. Just type:
  VDU 2,1,27,1,51,1,16,1,27,1,80,1,15,1,27,1,83,1,1,3
  which selects Pica, condensed and superscript, and alters the line feed to 16/216in.

- Robert Bergs offers the following tip for users of *Quest Paint* who would like to compress their pictures using our screen compressor (Pieces of Eight, September 1991). Just enter the I/O menu and press print. At the prompt type *SVPIC <filename> and your picture will be squashed and saved! To reload do similar but type *LDPIC <filename>. Apparently *Quest Paint* thinks that the commands are for printer dumps and so displays the screen in full ready for dumping. Another use for this, says Robert, is to get text onto the screen. Prepare an Ascii file, select print and type *TYPE <filename> – the text will appear on the screen.

- Archimedes users have always had the luxury of sprites, but Glyn Davies points out that Master owners needn't despair. On their welcome disc in the Library directory can be found a sideways Ram image called *Spriter*. To install use . . .
  *SRROM 6
  *SRMLOAD Spriter 8000 6 Q
  . . . or something similar. Then press CTRL-BREAK. Type *HELP SPRITES for a list of the available commands. Most are identical in operation to those on the Arc. Also, *HELP GRAPHICS will list all the relevant VDU, GCOL and PLOT codes needed to use the sprites.

directory viewers to open.
{Close} precedes one or more directory viewers to close.
{VDU} precedes a series of VDU codes. These must be integers separated by commas and may not include semicolon or '|'.
{Module} precedes one or more modules to load.
{Application} precedes one or more application to load.
{Mode} precedes the desired screen mode number.

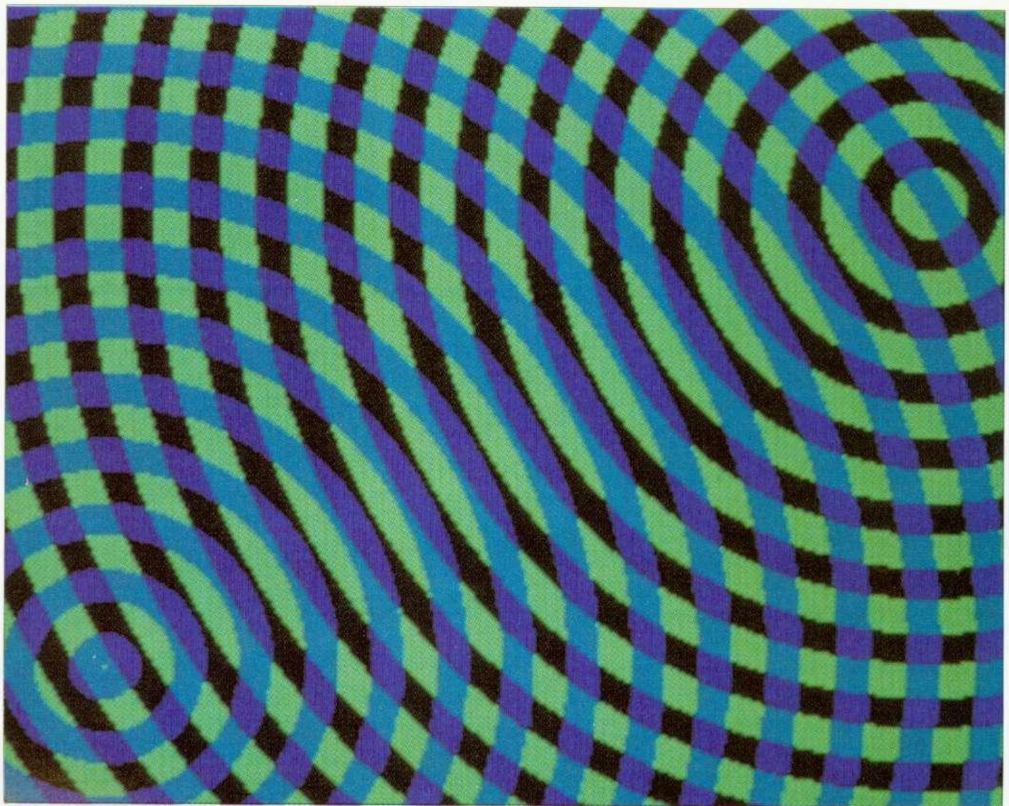
For {Open} and {Close}, full pathnames should be given.

To get an idea of how to use these, look at figure two, which shows how to set up a typical word processing environment. The VDU keyword is used to send a string of codes to prepare the printer.

If you double-click on *Auto* and don't hold down a key, the file *Default* is used. This special file can be used to set up a 'general' environment.

One subtle modification to *Auto* that Andrew suggests is to include a hard space (produced with ALT-SPACE) in the title, to give '! Auto'. Don't forget to check the sprite name though. If you keep the application in $ with *System* this ensures the system directory is seen first and the path, System:, is ready for any application that requires system modules and such.

Andrew has kept *Auto* short and to the point and, as he says: 'the program is structured to allow for easy expansion'. As always, if you have any useful enhancements for *Auto* or any other ✱INFO listing we'd love to see them.



Going around in circles can be entertaining

✱UPDATE

● Ron Wardeneir has spotted a problem with his *UpTime* application (✱INFO, April 1992). Apparently the five-byte time was converted to a four-byte value relative to 1 January 1991. The maximum four-byte value &FFFFFFFF corresponds to about 497 days, and hence the program goes wrong (and time 'wraps around') on 12 May 1992. Ron has supplied the corrections in the form of a command file, *UpTime+*. This should be entered using *Edit* or similar and used by typing *EXEC UpTime+. Note that it expects *UpTime* to be in $. The file alters *RunImage* appropriately. Make a copy to be safe, or invest in the monthly disc which has on it the complete new version.

● Gordon Sinclair spotted an occasional problem with *SprEd* (*BAU*, January 1992). It seems sprites of certain sizes can cause problems because an attempt is made to call OS_Heap with a non-word size heap block. These lines of *RunImage* must be added or changed:

```
5135wordsize%=(size%+3) DIV 4 * 4
5140SYS "Wimp_SlotSize",appsizeout%+wordsize%,-1
5150SYS "OS_Heap",0,heapout%,,wordsize%
```

Note that the line numbers are different on the subscriber's disc – 5521, 5530 and 5540 to be precise. Apologies for the error and the discrepancy in line numbers.

● E J Preston of North Yorkshire put in a request to Questions and Answers for load and save routines for eight-bit *WaterWorld* (✱INFO, July 1992). We are happy to oblige and the extra lines needed are given as *Water+* on the yellow pages. Just change/add these lines to *WaterEd*. The complete revised listing is included on the monthly disc.

Because there isn't room on the screen for a 'file window' the loading and saving had to be kept quite simple. So, to save the current screen press S followed by a letter A to Z. This will save the screen as *WetPicX* where X is 'A' to 'Z'. The details of the valves are saved in a separate file called *ValvesX*. To reload a screen, press L and the screen letter. If the files can't be found, a beep will be sounded. Because L was used to draw lines in the original, SPACE has taken over this role to avoid a clash.

CIRCLES

Program: Circles
Description: Graphic demo
Author: Mark Hobson
Machine: 32-bit
Listing: 140 lines Basic

This graphical offering shows the 'fringing' effect produced when two sets of concentric rings overlap. Two lots of such rings are moved around on the screen to create the pattern.

Two sprites are created containing the ring patterns and these are then plotted in different positions (taken from a table). The colours are changed smoothly from frame to frame to enhance the overall effect.

RASPBERRY RIPPLE

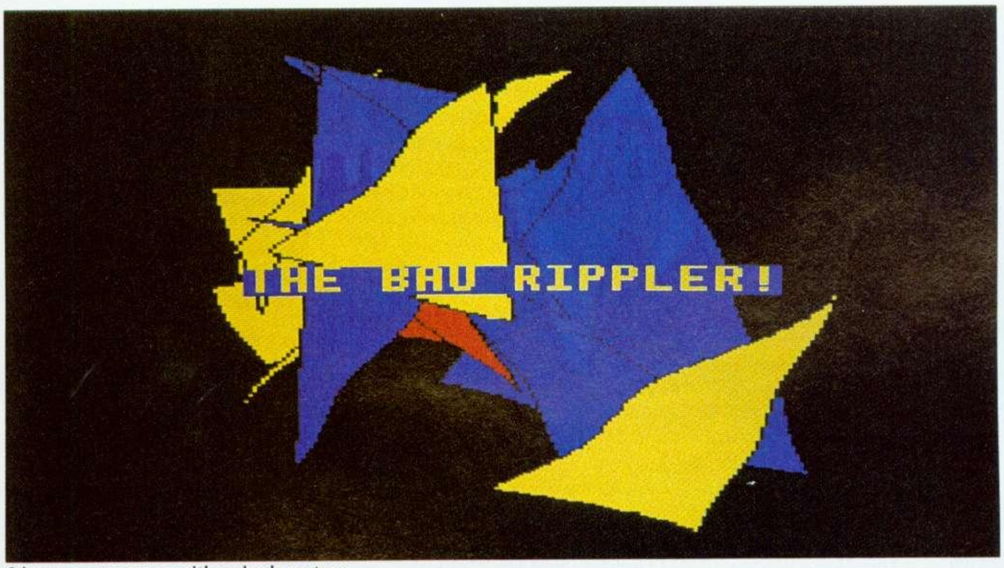
Program: Rippler
Description: Graphic demo
Authors: Richard Talbot-Watkins and Matthew Goldbolt
Machine: Eight-bit
Listing: 120 lines Basic/code

There's not much to say about this program – just run it! It will generate a simple demonstration screen, and then 'ripple' it in a similar way to Stuart Cupit's Arc program in the March 90 Risc Revue. For each line of the picture, a value is looked up in a sine table and used as an offset to the vertical position of the line on the displayed picture. This is achieved with an 'unrolled' loop to copy screen lines around for maximum speed. It is much more effective with 'proper' screens – try a digitised picture if you have one.

FAST MATHS

Programs: Div10, Mod10
Description: Maths routines
Author: A F Reysenbach
Machine: 32-bit
Listings: 20-30 lines Basic

A couple of mathematical quickies that might help some of you Arm code programmers cut a corner or two. They are speedy routines to perform DIV 10 and MOD 10 that you can use



Stir up your screens with a ripple or two

in your own programs. All the instructions used are 'fast' ones (meaning there are no multiplies).

CIE

Program: CIE
Description: Graphic demo
Author: David Walters
Machine: 32-bit
Listing: 60 lines Basic

If you enjoyed David's Gouraud listing in July's ✱INFO you will no doubt appreciate his latest offering. Here's what *CIE* is all about, in David's own words . . .

'Continuing my search through the fundamentals of computer graphics, I came across something called the CIE

BEGINNERS' BIT

Procedures and functions are an invaluable part of Basic programming. Whenever a section of program needs to be used in more than one place it is usually best to put it in a procedure. This saves space and makes the program more readable. Also, procedures can be used to break programs up into well-defined sections, again aiding readability. And of course, the more readable a program is to you, the more likely it is to be understood by another programmer. So, if you are starting out in Basic programming, it is a good idea to get into the habit of using PROC and FN from the start.

The only difference between a procedure and a function is that the latter returns a value. This may be a string or number. PROCs don't return parameters (although Basic 5 does allow this – more next month!).

As an example, have a look at the two programs *FXdemo1* and *FXdemo2*. They perform exactly the same task, but *FXdemo1* is written without PROCs or FNs, whereas *FXdemo2* uses them extensively. The most noticeable difference is that *FXdemo2* is much easier to follow than *FXdemo1*. The procedure names give clues as to what each area of the program does. The long multi-statement lines of *FXdemo1* are not present in *FXdemo2*. Nor are the GOTOs which are the hallmarks of bad programming technique and lead to so-called 'spaghetti' programming.

Strings of characters are read from DATA statements at the end. Embedded within these are control sequences to turn on and off italic and bold effects ('@I' and '@B' respectively). The effects are produced by reading a character's eight-byte definition (using Osword call 10) and then manipulating those eight bytes before displaying the modified character. It's a simple way of producing text effects and has been featured several times over the years in *BAU*.

In *FXdemo2*, global variables are set up in PROCinit and then PROCtext is called to display the text. Most programs can be divided neatly into two main parts like this. Sometimes a third section may be needed to 'tidy up' after a program has finished (switch the cursor back on, re-enable the ESCAPE key etc).

PROCtext reads lines of text until the terminator '*' is reached. Each is passed to PROCdisplay_line. This procedure takes a single parameter r$, which is the string to be displayed. Note that r$ in PROCdisplay_line is completely different to r$ in PROCtext. All parameters declared in DEF PROC statements are 'local', so although r$ in PROCdisplay_line is initially a copy of r$ in PROCtext, it can be freely changed without affecting the r$ in PROCtext at all. We could give it a different name to be clearer, but in long programs you cannot always remember all the names you've used. Local variables get around this problem, since you only have to worry about clashes of variable names within a particular procedure or function.

Variables can still be made local even if they are not included in the DEF PROC or DEF FN. This is done with LOCAL. For example, r$ is declared as local after DEF PROCtext and this ensures there is no clash with any other variable called r$. Remember, as soon as the ENDPROC is encountered the local variables for that procedure or function are forgotten.

PROCdisplay_line looks at the first character of r$. If this is '@' it must be a control sequence, so FNeffect is called. Otherwise FNchar is called. FNeffect analyses the control sequence and sets the flags ital% or bold% accordingly. It then returns the string minus the control sequence so the remainder of the text can be processed.

FNchar displays the first character in the string and then returns the rest of the string for further processing. The character's definition is read with Osword, and then PROCmake_bold or PROCmake_italic (or both) are called to process the character before display. In fact, the Osword call returns the eight bytes defining the character in the block q%. These are altered if necessary, then user-definable character 224 is given the altered definition and displayed.

For eight-bit users, procedures are particularly useful for keeping programs structured and avoiding the dreaded GOTOs. With Basic 5 on 32-bit machines the IF . . . THEN statement can be split over many lines, but this isn't possible on eight-bit machines. So, if you want to include several statements after an IF you'll either end up with a very long line, or you will find yourself in need of a GOTO. It is much better to put all the statements into a procedure. Here is a typical IF . . . THEN sequence in Basic 5 which traps errors:

```
IF error% THEN
 VDU 7
 PRINT"An error has occurred'
 *FX 15
 PRINT"Press a key...'
 key=GET
ENDIF
```

And here is how to do the same thing with procedures:

```
IF error% PROCerr

DEF PROCerr
VDU 7
PRINT"An error has occurred"
*FX 15
PRINT"Press a key..."
key=GET
```

Next month, we'll continue our look at PROCs and FNs, including the special RETURN parameters in Basic 5 on 32-bit machines.

BEEBUG

The Archimedes Specialists

Beebug are one of Acorn's largest dealers. We have a large showroom in St. Albans (close to the M25 and M1) and an efficient mail-order service specialising in sending Acorn Computer equipment to homes throughout the country. Additionally, we have an excellent technical support team to provide any advice and help that you may need. Beebug are not here today and gone tomorrow. You can trust us, we have been working with Acorn for over 10 years now!
Our sister company, RISC Developments, is also well known for producing quality software and hardware add ons for the Acorn range, as well as the RISC User magazine.

The New Line Up

We now have great pleasure in offering the new and exciting line up of computers from Acorn. All of these systems feature RISC OS 3.1, the new multi-tasking operating system and are supplied with a mouse, stereo sound, 2Mb (unformatted) floppy drive, serial and printer ports. Additionally, they will all run any of the standard Archimedes software titles, of which there are now over 2,000.

A3010

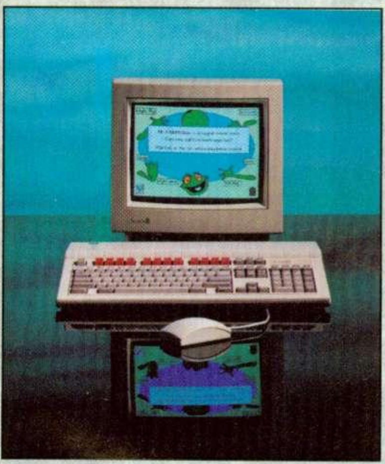
This system represents an incredible breakthrough for Acorn. For only £499 INC VAT you can now have the full power of an Acorn RISC OS computer. This system is based around the new ARM 250 processor, which typically offers a 50% speed increase on ARM 2 systems (A3000/A310/A400). 1Mb RAM (upgradable to 2Mb), 2 joystick ports and TV modulator are all built in to the A3010. It is supplied with EasiWord word processor, Audio Training Tape and Quest for Gold Game in a pack called The Family Solution. Alternatively, the A3010 is available in The Learning Curve package. This also includes a RAM Upgrade to 2 Mb, Colour Monitor, PC Emulator, Guide to the National Curriculum and Genesis Collection.



0172g	A3010 Family Solution	£424.68
0182g	Colour Monitor for A3010	£220.00
0173g	A3010 Learning Curve	£680.00

A3020

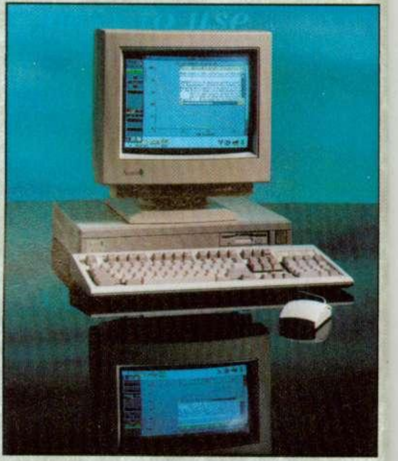
This system is targeted towards the schools. Along with the ARM250 it offers 2Mb RAM (upgradable to 4Mb), colour monitor (or multi-scan) and optional 60Mb internal hard drive.



0151g	A3020 FD Colour	£749.00
0152g	A3020 FD Multi-scan	£799.00
0155g	A3020 HD60 Colour	£899.00
0156g	A3020 HD60 Multi-scan	£949.00

A4000

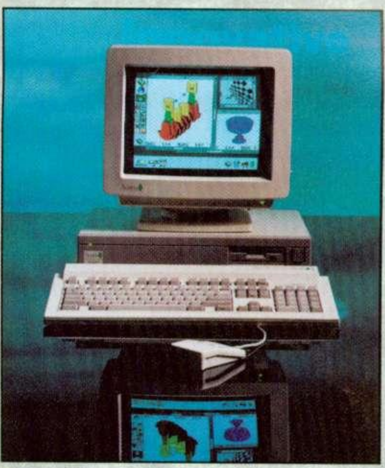
This system is supplied in a slimline version of the A5000 metal casing. It has a separate PC style keyboard, the ARM250 processor, 2Mb RAM (Upgradable to 4Mb), colour monitor (or multi-scan) and an 80Mb hard drive. It is also available in a Home Office pack which includes Easiwriter wordprocessor, Audio Training Tape and Desktop Database.



0227g	A4000 Colour	£949.00
0234g	A4000 Multi-scan	£999.00
0209g	A4000 Home Office Colour	£999.00
0215g	A4000 H. Office Multi-scan	£1049.00

A5000

This now represents even better value for money. The A5000 features the ARM3 processor, 2Mb RAM (upgradable to 4Mb), an 80 Mb hard drive and multi-scan monitor. It is available in a Learning Curve bundle which also includes Acorn DTP, 1st Word Plus wordprocessor, Pacmania Game, PC Emulator and Genesis Plus. A separate version of the A5000 is also available (but not in the Learning Curve), which includes 4Mb RAM and 120 MB hard drive as standard.



0211g	A5000 2Mb HD80 Multi-scan	£1399.00
0206g	A5000 4Mb HD120 Multi-scan	£1599.00
0213g	A5000 Learning Curve	£1445.96

A4 Portable

This is effectively an A5000 in a notebook format. An excellent machine with ARM3, 2Mb RAM (upgradable to 4Mb) and optional 60Mb internal hard drive. (Free PC Emulator with 60Mb version until Christmas.)



0317g	A4 2Mb FD	£1399.00
0316g	A4 4Mb HD 60	£1699.00

Acorn Pocket Book

This is the surprise addition to the range. It is not RISC OS based and has none of the features shared by the rest of the systems. It has built-in applications of wordprocessor, spreadsheet and database with 256K RAM and optional 4Mb Solid State Disc. An optional link kit enables it to transfer data to any Acorn RISC OS computer.



0390g Acorn Pocket Book £212.72

RISC OS 3 Upgrades

Upgrades to the new version of RISC OS are now available. This will certainly become the new standard for all Archimedes machines. A3000, A540, A400/1 series computers need only code 0888d. A305, A310, A440 systems will also need a Hardware Upgrade Kit (dealer fit) code 0887b. A5000 owners need a ROM only kit, code 0889b. If you are unhappy about fitting RISC OS 3 yourself, we are pleased to offer a free fitting service to customers. Please phone to arrange this.

0888d	RISC OS 3 Complete	£41.70
0889b	RISC OS 3 (For A5000)	£16.17
0887b	Hardware Upgrade Kit	£25.53

For More Information

Please write or phone for more information or an Acorn brochure. Additionally we would be pleased to send you a complimentary copy of our 52 page full colour catalogue on just about everything for the Archimedes computer.

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These are all new products so please call to check stock availability. Orders received will be dealt with in strict rotation and cheques not cashed or credit cards debited until your system is actually sent.

Prices are shown exclusive of VAT.

Carriage: RISC OS please add £3.00, computers please add £9.00.

Educational establishments, please phone or write for quotation.

BEEBUG Ltd. 117 Hatfield Rd. St.Albans. Herts AL1 4JS Tel. 0727 40303 Fax 0727 860263

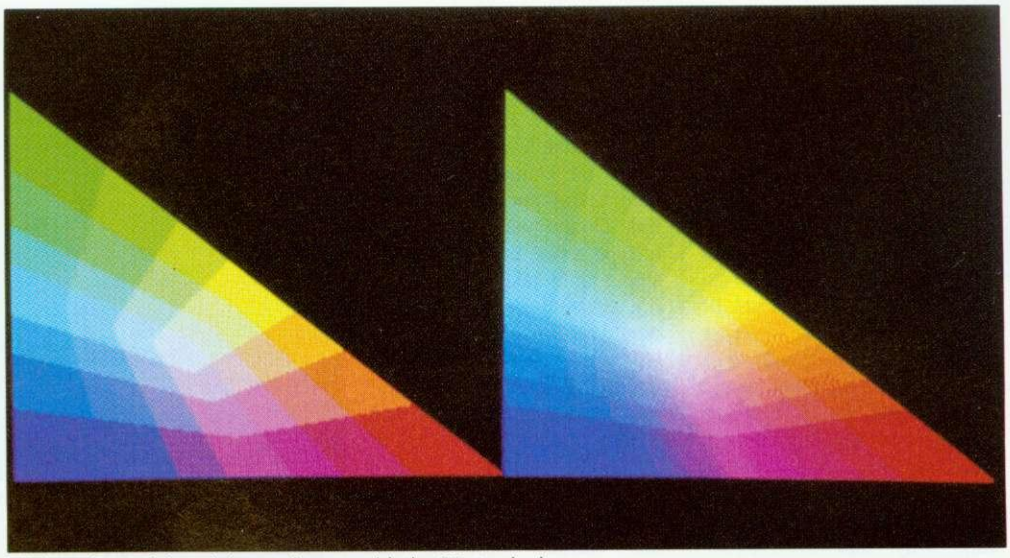
diagram. But what was it, and how could I display it on the Archimedes?

'Apparently the Commission Internationale de L'Eclairage (if you excuse my French) came up with this diagram in 1931 to standardise the way in which colours are specified in terms of red, green and blue. The original CIE diagram contained all the colours visible to the naked eye. Current computer monitors are incapable of displaying all these colours but an approximated part of the diagram can be generated without too much difficulty.

'My program displays this part of the CIE diagram in the form of a triangle (you will note my interest in this shape). The colour mapping to the Archimedes palette is performed by my RGB colour selector (more useful than I first thought, and it's faster than *ColourTrans*).

'On top of that, I have included a full RGB colour ETT (Error Transfer Technique) procedure (the one in Gourraud was only single colour). The difference that this makes can be clearly seen as the two diagrams are drawn side by side.

'Now this program runs somewhat slowly, so I've put in a size% of 300 to show you what it does. At the maximum sensible size of 640, the complete image will be displayed precisely one kettle boil and a cup of tea later . . .'



All the colours of the rainbow – almost – with the CIE standard

STATION TO STATION

The trickiest part of *Chat* is establishing the link in the first place, so we thought a description of how this works would be useful. If you read this with a copy of the listing to hand, you should be able to extract some useful procedures for use in your own programs.

FNwhoami uses an OSWORD call to directly access the fileserver to find out the user name of who is running the program. The user is then asked who they wish to chat to. Assume for the moment that they type in a name, for example, Donna. PROCchat is called to start the link up. The name is converted to uppercase and a checksum calculated for it (we'll see why in a bit). FNuser is called to return the names of users currently logged on. As with FNwhoami this communicates directly with the fileserver. When the required user is found, a message is sent to their machine ('Vikki wants a chat'). If that user wasn't found then an error is given.

Now, quickly jumping to the other machine, Donna has just received a message that Vikki wants a chat, so she types CHAIN "CHAT" and presses RETURN. At this stage, Donna herself knows who wanted to chat to her, but her machine doesn't – *NOTIFY only inserts the string into the keyboard buffer – it doesn't store it anywhere for us to read. The machine will also need to know Vikki's station and bridge number in order to send data to her. All Donna's machine does know is her (Donna's) user name. So, it calculates a checksum of it (using FNcrc) and broadcasts it across the whole network, effectively saying 'Donna's Here!'. (A checksum is used because broadcasts can only contain up to eight characters, but user names can be up to 10, so to avoid truncation and thereby possible confusion, a numeric value is calculated from the letters of the user name)

Meanwhile, back on Vikki's machine, it has just notified Donna's machine, so it waits for up to 20 seconds listening for any broadcasts on the network. FNwait_for waits for a given broadcast to be received for up to a given amount of time. Vikki's *Chat* therefore waits for Donna's checksum to be received. If it isn't received in the time an error is given (No reply). If it is, Vikki's machine will then know the station and bridge number of Donna's machine (because it will be contained in the broadcast it has just received).

All that remains is for Donna's machine to find out Vikki's station and bridge number. This is performed in a similar way although Donna's machine only waits for a couple of seconds to receive Vikki's broadcast.

Data can now be transferred as both machines know the station and bridge number of the other machine. The only slight complication comes in that it would be nice to display on each person's machine who they were chatting to and where they were. Vikki's machine knows she is chatting to Donna (because Vikki typed it in) and also knows where on the network Donna is, it also knows who 'it' is (from FNwhoami) but doesn't know where it is (in relation to Donna) – it is possible to read your own station number, but your bridge number will vary according to who you are chatting to. Donna's machine only knows who it is and the station and bridge number of Vikki's machine, it still doesn't know where it is or who it is chatting to. So this data is packaged up and sent to the other machine prefixed with a special character (254). Each machine can then print useful information about the users above each window.

After that little lot, the actual chatting is relatively simple. A repeat loop is entered that reads characters from the keyboard, displays them in the top window and adds them to a string called out$. When this string gets longer than five characters or 1/3 second elapses it is sent to the other machine. Two special cases are detected, RETURN is translated to character 255 so it can be included within a string and ESCAPE sets the done flag to indicate that the user has finished. The repeat loop also monitors any reception from the other machine and displays any text received in the bottom window. The special characters 254 and 27 are dealt with in PROCgot_chars displaying the log-on and gone messages respectively. 255s are translated back to 13s by PROCinsert.

Note that is is quite possible to transmit control character across the net. Some of these may be useful (CTRL-G for a Bell, CTRL-K to scroll your window down, CTRL-L to clear your window) while others might well have disastrous effects (CTRL-V to change mode, for example) so watch out! Teletext control codes are also sendable and the default SHIFT-function keys generate coloured (and flashing) text codes, so you can easily add a little variety to your chats.

CHATTERING AWAY

Program: Chat
Description: Econet utility
Authors: DA and DL
Machine: All
Requirements: Network
Listing: 250 lines Basic

Chat is an Econet utility that allows two users to chat to each other via the network. The screen is divided into two 'windows'. Each user types into the top window and, as if by magic, the words appear in the bottom window of the other user's machine!

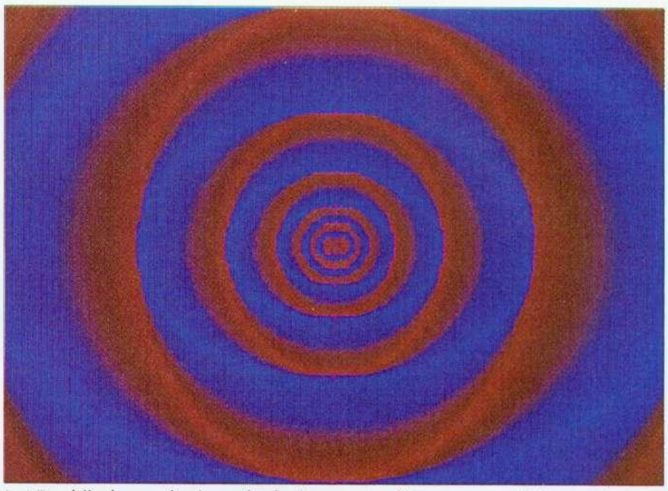
Since we started *INFO we've received a number of requests for Econet utility programs. The *Chat* program presented here is the development of an extremely ropey program that has been lurking

on the Redwood network for about five years. So we thought it was about time we dug it out, dusted the, er, dust, off it, threw it away and started again!

Once saved in your library, the program couldn't really be easier to use; say there were two users, Vikki and Donna and Vikki wanted to chat to Donna. She would type CHAIN "CHAT" and at the prompt 'Chat to whom?' would type DONNA. The program would look around to find where Donna was logged on and notify her that 'Vikki wants a chat'. This would appear on Donna's screen in exactly the same way that a *NOTIFY would. Assuming Donna also wanted to chat, she would type CHAIN "CHAT" and simply press RETURN when asked to whom she wished to chat. Their two screens would then be divided in half and each person could type in the top 'window' on their screen.

Chat program transmits the text to the other machine and would display it in the bottom window of the recipient's screen. When either user had had enough chatter, they would press ESCAPE, which would display 'Vikki has gone' on Donna's screen (or vice versa) and terminate the link. Donna would still be able to type away, but no transmission would take place. Pressing ESCAPE on her machine would return her to Basic.

If you'd like to know more about the inner life of *Chat*, see the box ('Station to station'). *Chat* will work on all machines, including 32-bit ones, by means of the BBCEconet module. This intercepts the various OSWORD and OSBYTE calls and translates them into the appropriate SWI calls to the real Econet module. Obviously this is not a particularly wonderful way of going about things, but it does mean that one program will work on all machines. We promise to cover Archimedes Econet handling in a future issue and hope to bring you a proper multi-tasking desktop version of *Chat*.



Let Eye hijack your brain and take it away to distant zones of time and space

GOOD VIBES

Programs: Eye, Eggs
Description: Graphic demos
Author: Jan Vibe
Machine: 32-bit
Listings: 70 and 40 lines Basic

Our *INFO column wouldn't be the same without the regular graphical offerings from Jan Vibe. This latest pair of programs both make inventive use of the Basic ELLIPSE command.

Eye draws a tunnel-like pattern on the screen and then grabs it as a sprite. This is then continually scaled and plotted on the screen to give the effect of moving through the tunnel. Scaling takes quite some time on an Arm2 but if you have an Arm3 machine try reducing the value of delay% (to about five, for example).

Eggs needs no introduction other than to say it's rather strange but oddly pleasing! Run it and see. If you'd like to know more then refer to this month's Line-by-Line box which explains the listing in full.

*QUIT

As always, it's programs and tips from readers like you that make *INFO the internationally renowned institution that it is. Listings, applications, hints, tips or even requests are most welcome. All items published earn for their creators a cash reward (and near limitless fame and respect from your fellow readers).

All but the shortest listings should be on disc together with a description. A stamped addressed envelope will ensure the return of your disc. If you are a young reader please let us know your age.

So send your software submissions to us at:

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101 Bayham Street,
London NW1 0AG.

LINE BY LINE

This month's line-by-line listing is a short graphical ditty from none other than our regular: Jan Vibe. The program is called *Eggs*, and before looking at it in detail here are a couple of pieces of background information that may help beginners follow the program:

ELLIPSE and ELLIPSE FILL are Basic 5 commands to allow you to display any elliptical shape on the screen. They take at least four and sometimes five parameters:

ELLIPSE [FILL] x,y,maj,min [,ang]

Here, x and y are just the screen co-ordinates of the centre of the ellipse. maj and min are the maximum and minimum radiuses. (If these are the same then you'll get a circle) Finally you can add an angle, by which your ellipse will be rotated. This must be in radians, so if you have an angle in degrees, d say, convert using RAD(d).

SYS "OS_Byte",112 and 113 select screen banks. Many *INFO programs (particularly Jan Vibe's) make use of two screen banks for smooth animation. The first picture is displayed on bank 1 and the second drawn 'secretly' on bank 2. Then bank 2 is displayed and the next picture drawn on bank 1 which is now hidden from view. This process continues so the user only ever sees the finished pictures and not their preparation.

THE LISTING:

60,70 Select mode 9. Choosing mode 137 first ensures both screen banks are blanked.
80 Switch cursor off
90,100 Set screen bank variables. s1% is the bank being updated, s2% is the bank being displayed.
120 Set a% to 0. This is the angle by which the 'eggs' are rotated.
130-160 Loop to define colours. This useful loop sets colours 1-12 to a smooth progression.
170 Set colour 13 to white.
180 Set c% to 0. This is the colour counter used to change the colours of the eggs.
190 Set error handler. If an error (for example, Escape) occurs, control passes to line 370 where it will be dealt with.
200 The main loop begins.
210 WAIT for VSync. You should always wait for the start of a frame before swapping screen banks to avoid flicker.
220-230 Select screen banks for update and display.
240 Swap bank numbers.
250 Clear bank to be updated.
260 Update c%. This variable cycles from 1 to 12, moving on by one colour each frame. It is used to change the colour of the eggs smoothly.
270 Loop to plot the small eggs.
280 Set t to the angle of an individual egg in radians.
290 Move colour on so small eggs are 'staggered' in colour.
300 Select colour.
310 Plot small egg. SIN and COS are used to calculate the eggs position, and the egg is rotated by 10*t as well.
320 Do next egg.
330 Select white.
340 Plot big egg
350 Add 1 to a% so all eggs are rotated by 1 degree next frame.
360 Repeat forever.
370+ The error handler. Select screen bank s1% and report error. This ensures error message isn't shown on the 'hidden'bank.

ARCterm 7 1.40

Our popular comms package now supports Minitel emulation and includes an Econet modem server. Recommended by Hampshire LEA. Existing users return both disks and SAE for upgrade. £68

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Quantum 240Mb (2yr gtee) + Morley SCSI	£699
Fujitsu 520Mb (5yr gtee) + Morley SCSI	£1199

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External drive works with most SCSI cards eg Oak, Acorn, Vertical Twist (or add £100 for a Morley card). Both systems include 1 floptical floppy (usually £20).

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Externally boxed rewritable optical drive. Works with most SCSI systems and stores 120Mb on each £50 disk. It's quick and the media is very secure - it uses a combination of laser heating and a magnetic field to store the data. Drive comes with one disk and cables. £1099

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HARMONIC VERSES

Richard Garrett provides some words of wisdom for users of BAU's HarmSynth synthesizer

No doubt you've all been avidly following Dave Radford's recent series on sound and, if you are a subscriber and have last month's disc, you've no doubt experimented with his excellent harmonic synthesis program. By now, you must have loads of wicked beeps and whooshes and whistles but, let's face it, there's an awful lot of parameters to be considered in setting up a sound and, if you'xve been working by trial and error, you may be at a loss to explain exactly how you arrived at the results you got.

Here is a systematic way you can build tones to imitate real musical instruments, using three sound elements called timbre, dynamics and expression. The aim is not to make your Arc sound like Yehudi Menuhin, Miles Davis or Eddie Van Halen, but to use familiar sounds as a starting point when producing your own tones and sound effects.

TIMBRE

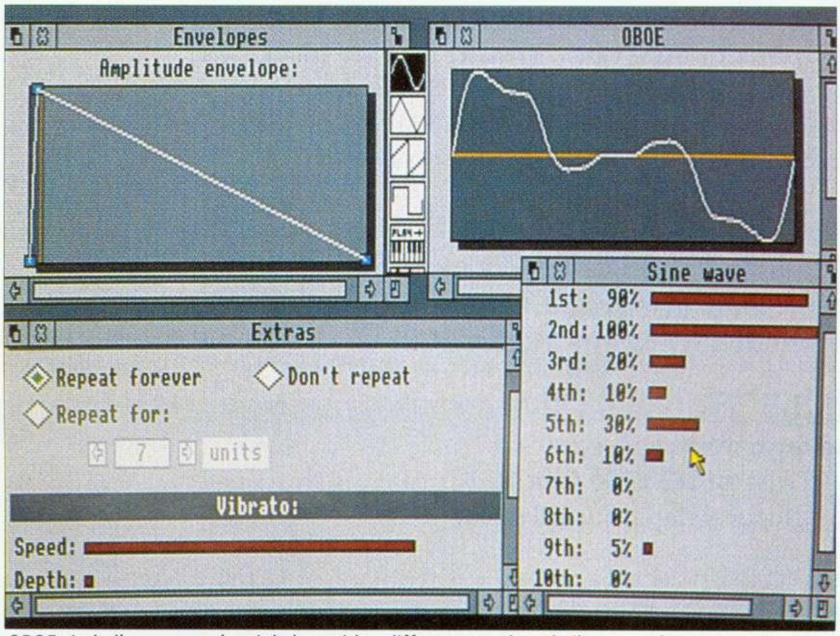
Timbre is a word used in music and acoustics to refer to the tone, or harmonic content, of a particular sound, for example, a 'reedy' clarinet or a 'silvery' fiddle. Musicians, being intuitive beings, tend to make do with adjectives like 'reedy' or 'silvery' when describing this quality, but acousticians prefer to break it down into 'spectra' using a mathematical technique known as Fourier analysis.

From the point of view of Fourier analysis, any complex wave is simply the sum of many sine waves, which differ in their frequency and amplitude. Modern hardware and software 'spectrum analysers' take electronic signals and produce histograms showing the frequency and amplitude of these Fourier components.

DETAILED HARMONICS FOR VIOLIN NOTE A (440Hz)

1:*100* 2:*45* 3:*21* 4:*25* 5:*48* 6:*53* 7:*53* 8:*63* 9:*52* 10:*27* 11:*24* 12:*15* 13:*15* 14:*33* 15:*11* 16:*33* 17:*23* 18:*11*

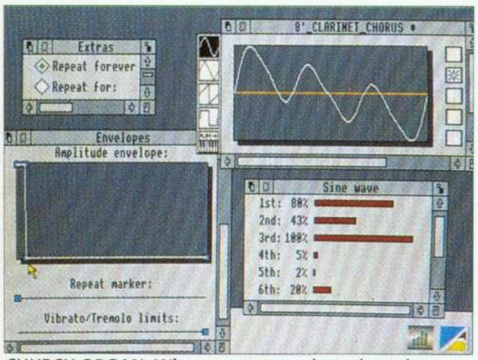
If you don't happen to have a spectrum analyser, don't despair. Any moderately sized public library should have a selection of books on music and acoustics with many illustrations



OBOE: A similar note to the viola but with a different attack and vibrato to the note

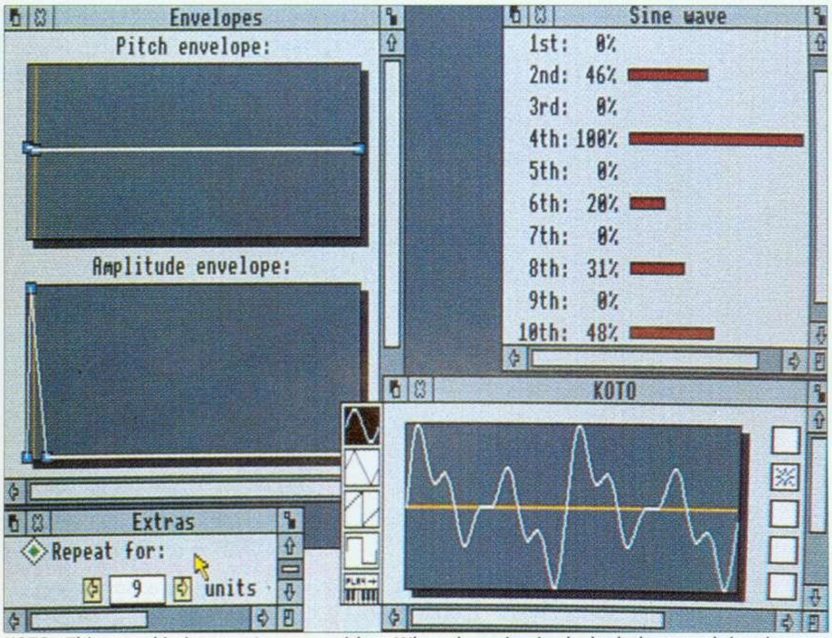
FOURIER COMPONENTS FOR INSTRUMENTS

Instrument	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
VIOLIN	100	45	21	25	48	53	53	63	52	27
VIOLA	100	45	40	20	40	30	10	14	8	8
VIOLINCELLO	100	75	100	34	15	26	30	14	40	10
DOUBLE BASS	60	40	100	42	9	44	2	7	5	0
GRAND PIANO	100	41	95	43	17	0	6	–	–	–
HARP	100	58	80	13	12	10	–	–	–	–
ORGAN clarinet 8'	79	43	100	4	2	0	11	–	–	–
ORG gt. diapason 8'	100	81	11	4	3	5	–	–	–	–
FLUTE	100	100	10	20	25	3	2	2	–	–
CLARINET	100	0	50	10	60	30	50	30	10	2
SAXOPHONE	100	70	13	50	8	1	0	2	5	0
OBOE	90	100	20	10	30	10	0	0	5	–
FRENCH HORN	30	100	60	14	–	–	–	–	–	–
TRUMPET	100	100	80	75	40	30	10	10	5	5
TUBA	100	70	8	3	2	–	–	–	–	–
VOICE soprano	100	90	95	10	7	0	0	1	3	–

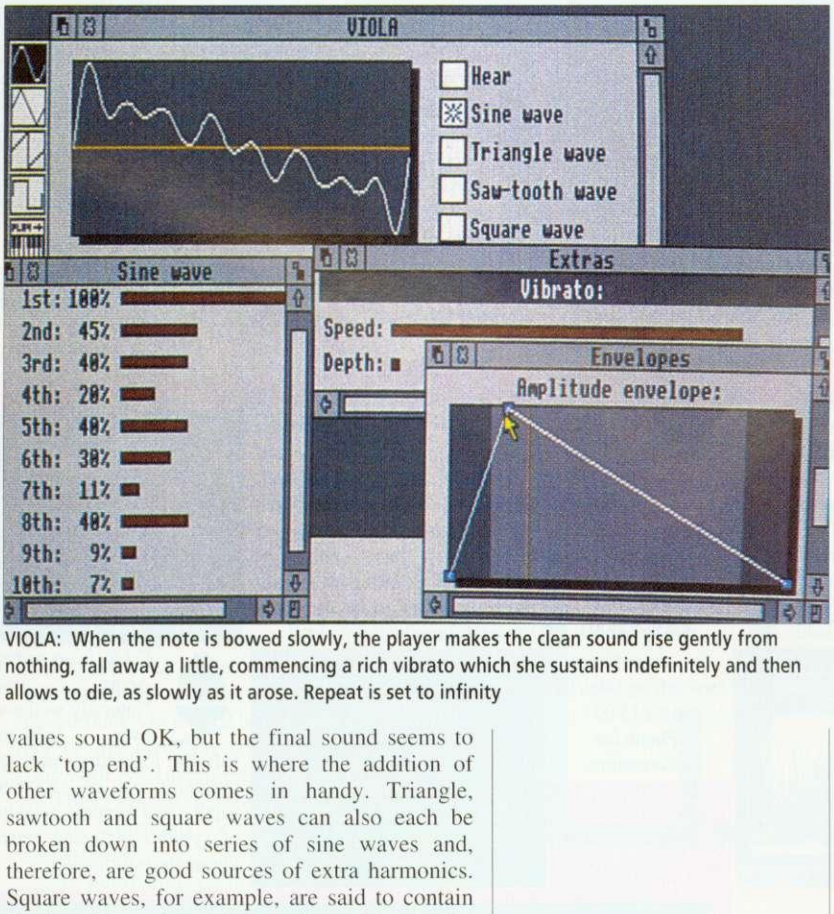


CHURCH ORGAN: When you press a key, the valve opens instantaneously and the pipe sounds at its maximum volume for as long as you hold it down. When you take your finger off the key, the valve shuts and the note stops dead. The sound has no vibrato or tremolo. In this example, the amplitude envelope starts at maximum and drops away to zero as soon as the key is released. The Repeat option is set to infinity at the maximum amplitude.

of standard sound spectra. When dealing with tuned instruments, sound spectrum data is sually shown as a series of intensities for each integral harmonic (see our first diagram). This is very convenient, as we can read the first ten values straight off the graph and into the sine-wave table in *HarmSynth*. Have a go, and see what it sounds like. As synthesized violins go, these



KOTO: This sound imitates a Japanese zither. When the string is plucked, the sound rises in volume very quickly and drops away to almost nothing almost as fast. Although the player can control volume, there is no way to sustain the note beyond its natural (short) duration, so the repeat is turned off. Although koto players don't use vibrato, they do sometimes bend the note upwards by pressing down on a string, and you could imitate this with a very slight positive pitch envelope at the start of the note.



VIOLA: When the note is bowed slowly, the player makes the clean sound rise gently from nothing, fall away a little, commencing a rich vibrato which she sustains indefinitely and then allows to die, as slowly as it arose. Repeat is set to infinity

values sound OK, but the final sound seems to lack 'top end'. This is where the addition of other waveforms comes in handy. Triangle, sawtooth and square waves can also each be broken down into series of sine waves and, therefore, are good sources of extra harmonics. Square waves, for example, are said to contain all the odd-numbered harmonics and can add a 'raspy' quality to a sound. In the case of our fiddle, we added a little high-frequency triangle wave (7 percent at the eighth harmonic) to give a bit more 'jingle' above the range of the sine table.

As a general guide to sounds: the first few harmonics sound mellow or 'rounded'; five to eight, often called 'bell tones', give more 'ding' to the sound; and higher values ('tines') make it more 'shiny' or 'jingly'. Have a look at the table on the facing page – it contains extensive data for a good range of other timbres.

DYNAMIC EXPRESSION

Much of the information we use to identify a sound as that of a particular instrument, derives, not from its timbre, but from the way in which the volume rises and falls at the beginning and end of the note, known as 'dynamics', and the way in which different slurs and vibrato sounds are added to different parts of the note, known as 'expression'. To see how this process works, take a look at the comments I have added to the pictures in this article.

Of course, there are numerous techniques for playing most instruments and, when designing a sound you should think about the particular effect you want. Imagine the sound in your head and then use the amplitude envelope to draw the way it swells, sustains and dies.

Some instruments produce small changes in pitch when you play them, for example a strong plectrum guitar note goes 'sharp' when first struck because the string is stretched slightly causing a rise in pitch which settles as the note sustains.

When using vibrato, watch the way people play and think about what they're doing. It's easy with string players – you can see them wiggling their fingers around on the fretboard in varying intensity from the gentle modulation of classical cello players, through Hendrixian two-note bends on electric guitar, to the muscular half-octave techniques used in sitar playing. Tremolo is less used in music and harder to apply but it could be dead good for digeridu impersonations.

GETTING ADVANCED

Real musical sounds are incredibly complex, so there is no way that you're going to produce a sound using a simple synthesizer that would fool an experienced instrumental player. If you want to produce sounds that will get anywhere close to the quality of real instruments, you will need to digitise their sounds by using a sampling package of some sort.

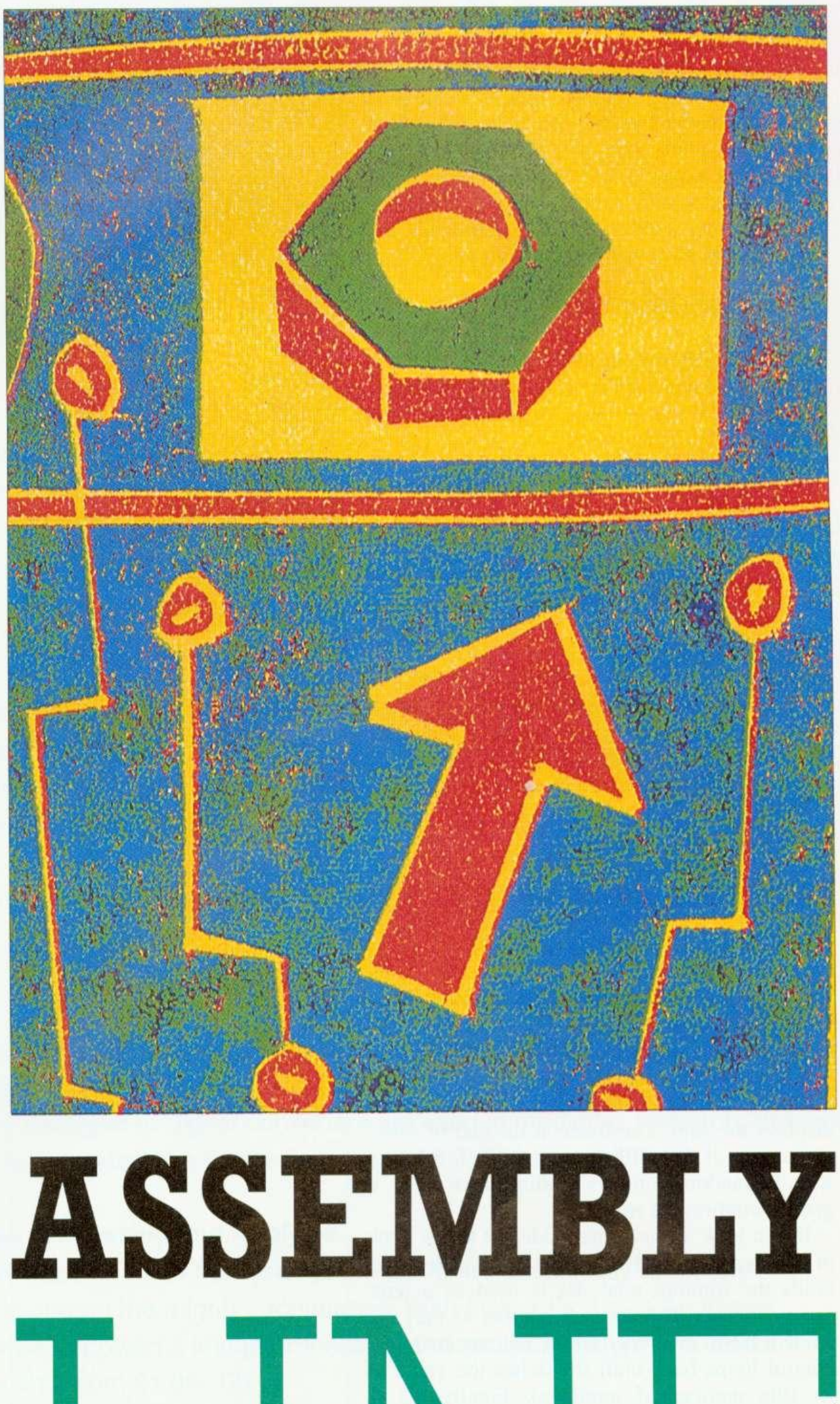
I've steered away from untuned instruments like drums, cymbals and other percussion, because these don't have purely harmonic (meaning whole number) spectra, but do have a go at them. A good tip when emulating these is to throw in a lot of seventh harmonics, which have a nice dissonant quality. Once you've used this technique, you're ready for the next step. Add lots more waves, pitch envelopes and so on, and see just how weird things can get.

FURTHER READING

- *The Acoustical Foundations of Music* by John Backus, published by McGraw Hill
- *Musical Acoustics* by Charles A Culver
- *The Technique of the Sound Studio* by Alec Murray Nisbett, published by Focal Press

ASSEMBLY LINE

Dave Lawrence explains more about Arm programming



PAUL SCHOFIELD

With your new found knowledge of the two Arm instructions LD and ST we can now take a look at how you would deal with simple arrays in Arm machine code. You should remember from last month that all memory accesses are indirect, meaning they need a register to hold the address you are referring to.

You should also remember that it was possible to add a constant to this register to allow program counter-relative data access. If you were very observant you might have spotted that I mentioned that this offset could either be a fixed constant or a register and a shift – I did keep that bit rather quiet.

As you can probably imagine, having a variable offset opens up hundreds of (well, maybe a dozen or so) programming possibilities to the discerning coder. To see the principle behind this, try typing in and running *Arm1* from the yellow pages.

Any guesses as to what the ADR on line 130 does? Well, to tell you the truth, it isn't really an Arm instruction at all. What it does is point the register (in this case R1) to the address given (in this case table). As with the LDR instruction we met last month, we are making use of the program counter to make the code position-independent.

As our little program here could theoretically be assembled anywhere in memory, we obviously won't know what the actual address of the table will be, so we can't (and, indeed, wouldn't really want to) 'fix' the value of R1 to one given address.

TABLE MATTERS

What we *do* know is that the table is a fixed distance away from the ADR instruction. Since the program counter keeps track of where in the program we are, we could use an ADD (or a SUB if the table was 'below' the ADR in memory) with an appropriate constant value to make R1 point to the table.

Unfortunately, the PC is a little tricky to make use of sometimes (you'll see why eventually) and, of course, we may add in some more code after the ADR, which would upset the constant we have just calculated and cause all sorts of problems! This is where ADR comes in – it's a form of shorthand to the assembler and it means: 'Assemble a suitable ADD or SUB which will point my register to this address.'

Let's get back to the *Arm1* program. Having set R1 to point to the table of values, we then load R0 with the contents of R1 + R0. MOV pc,link will return us to Basic with the loaded value passed back via USR. The small Basic loop at the end of the program simply calls the piece of code with A% (meaning R0) set to 0, 4, 8 and so on. These are the offsets from table for the eight, 32-bit, constants stored with the EQUD instructions.

One interesting point worth mentioning here, that you yourself may have noticed, is that constant offsets can be between –4095 and +4095, and not –4096, which is what you would expect if the number was stored in twos' complement format. This is because the constant is actually stored as a 12-bit number with one sign bit. This does, of course, mean that you can have +0 and -0, but it also means that register offsets can be either positive or negative.

This enables you to have instructions such as:

```
LDR R0,[R1,-R3]
```

Which, fairly obviously, will load R0 from the appropriate address.

We can make use of one further feature of LD and ST to tidy this program up a little. As mentioned above, the register offset can be a given a shift value. This can consist of any of the standard shift types (ASL, LSR, RRX, and so on) and a numeric only (sorry, you can't supply a fourth register!) value between 0 and 32. You can therefore have instructions such as:

```
LDR R0,[R1,R2,ASL #2]
```

This effectively multiplies R2 by four, adds it to R1, loads the word at that address and stores it in R0. In other words, it loads R0 with 'word number' R2 from a table stored at R1. If you change line 140 to:

```
LDR R0,[R1,R0,ASL #2]
```

and delete line 280, you should get the same result as before but using a shifted load!

ARRAYS

A useful example will follow in a minute, but just for the moment assume you have an set of data and you want to find the sum of all the elements. In Basic, you might write something like this:

```
total=0
FOR i=1 TO num
 total += a(i)
NEXT i
PRINT total
```

In Arm code, you would probably end up with something like *Arm2*. Here, you supply the start address of the block of data in R0 (A%) and the number of elements in R1 (B%). Printing USR(sum) adds up the numbers in the block and displays the sum. The Basic at the end of *Arm2* makes use of this, filling an 'array' in memory with 10 random numbers (adding them up as it goes to confirm the result).

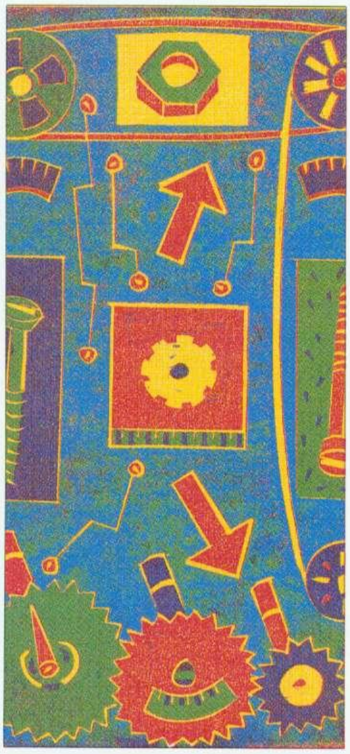
If you look at the actual code, R2 keeps track of which number we are on (starting with 0), R3 holds the running total, R4 is used as a temporary register to hold each number as they are loaded from memory. R2 is incremented and control loops back until it reaches the value of R1 (the number of numbers). Finally, R3 is copied into R0 so that the sum can be returned to Basic via USR.

REGISTER ALIASING

Now we are moving on to quite 'complex' (meaning, useful) examples, you may be finding it a little hard to follow through the listings. In the program segment above, I used variables called total, i, num and a(), so as to make (I hope) their functions self-evident.

Moving over to the *Arm2* listing, I've lumbered you with a stack of confusing register numbers, and since I'm meant to be removing the mysteries of Arm code, this probably only makes matters worse . . .

Well, I promise that from now on, examples will be a cinch to follow because I will be making use of something called 'register aliasing'.



Don't panic, as this is dead easy to use, and, in fact, every example we have explained to date has aliased some of the registers.

After the DIM in each example have come the two statements link=14 and pc=15. These merely set up two variables with the values 14 and 15. We can then write MOV pc,link and understand very quickly what was meant. (We could have used MOV R15,R14 – but which of the two instructions do you prefer?)

One feature of the Basic assembler is very useful, which is that a register number will be recognised either as R4, r4 or merely the single digit 4. As it is not prefixed by a #, it cannot be a constant, so it is taken as a register number. MOV pc,link therefore literally means MOV 15,14, but the assembler works out what you really mean by the instruction!

Obviously this could be taken further and names given to any or all of the registers. In the listing *Arm3*, nothing has changed functionally since *Arm2*, but I think you'll agree that it is a trifle easier to follow.

SORT OF AN EXAMPLE

To finish off this month, *Arm4* brings together a lot of useful features into one program. It is an implementation of a simple shell sort. As before A% points to a block of data and B% contains the number of data elements. CALLing sort sorts the data into ascending order.

A shell sort is very easy to program; for each element in the array scan through the rest of the array to see if there is a 'smaller' element. If there is swap the two. What could be easier! In the Arm version, i is used to step through the array (initialised at line 200, incremented and checked at line 400). At the start of each loop, minval is loaded with the value of the ith element, and min is set to i. j is also set to i to scan through the rest of the array.

The second loop, loop2 starts with a comparison. value is loaded with the jth element and compared to minval – the current lowest value. If it is lower, minval is set to this value and min is set to j to remember where it was. Note the use of MOVLT – a conditional statement. Lines 310-330 increment and check j. When j reaches the value of number, the rest of the array has been scanned. After this, a check is made to see if the first element of the array does, in fact, already contain the lowest value.

If it doesn't, value is loaded from the first element and stored in the minth element (this is just to get it out of the way) and most importantly, minval (the lowest value found in the rest of the array) is stored as the new ith element. These instructions are what physically move the numbers in memory, thus sorting the data. (A quick aside; what would you have to change in the program to make it sort the numbers into descending order?)

In this example, using small numbers, the comparison to see if a swap is needed is not strictly necessary, but if you were handling textual words or very large numbers it might save quite a bit of time if the elements don't need to swapped.

We're staying with arrays next month, but moving on with a couple of extra twists that can be added to LDs and STs.

DESKTOP VIDEO

ON THE MENU TODAY...

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Info

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Prices exclude carriage and VAT

WILD VISION



ABSOLUTE BEGINNERS

Confused by BAU? Now, it's as easy as ABC with Sarah Burns' A to Z of jargon



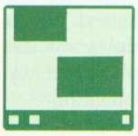
ABSOLUTE BEGINNERS: The page that aims to help those without a clue. If you do not have much technical knowledge, *BAU* can be difficult to read in places, so here is an A-Z that will help you to get more from the magazine.



BOOT: Nothing to do with giving the machine a kick to get it started. That doesn't work. Boot is an abbreviation of 'bootstrap', which, in turn, is American for shoelace, as in the phrase: 'He lifted himself up by his bootstraps'. This improbable feat is what computers routinely achieve, usually by dint of activating a tiny program in Rom (q.v.) which loads a slightly bigger program – and so on . . .



CRASH: Any computer user's nightmare. You spend hours typing away when the computer kindly informs you that it has suffered a fatal error. Fantastic. It can crash due to a machine fault, bad software or even human error. Often it is an unpredictable fatal machine-fault-type abnormal internal error. Always save your work regularly and keep a back up disc of everything you do.



DESKTOP: The first thing you see when you boot up the Arc. As easy to use as, um, the top of a desk – it ends up covered with half-eaten doughnuts, papers with coffee rings on them and piles of rubbish.



EMULATOR: To put it bluntly, an emulator is a piece of software that turns your technically excellent Arc into an apparent clone of another machine that is often slower and has a naff user interface. So why do it? Well, you may probably want to run all your old BBC B software, so the Arc's Model B emulator is immensely useful.

Also, it must be said that some other, and inferior, computers have succeeded in gaining a grip on the software market merely by dint of their unsporting cheapness so, if you need to run their easily available and often inexpensive software, you need to 'emulate' them. Among the emulators available on the Arc are the PC emulator (most PCs are inferior to 32-bit Acorn machines) and the public domain Sinclair Spectrum emulator (emulators are often slower than the original machine, but in this case, as you can imagine, there's no problem).



FONT: A full collection of letters, grammatical markings, numbers and special characters written in a distinctive typeface, thickness and size. Every application has a selection of fonts. Most include *italic* and **bold** options. If you have *Impression*, try Selwyn's excellent shapes and scribbles.



GRAPHICS: Some of the Arc's best features – it has 256 colours and is a very high-resolution machine. Used with software such as *Revelation 2, Render Bender* or *ArcCol,* the Arc enables you to do amazing things in this area. Take a look at the ✱INFO pages for hints on programming and to see how other readers use the Arc to its full capability. The graphics page will keep you updated on new applications and software.



HYPERTEXT: A much-misrepresented concept. Hypertext in its most definitive form, as laid out by the Massachussetts Institute of Technology's Media Lab (Penguin's *The Media Lab* is much recommended if you wish to understand the future of computing) is an entirely new approach to knowledge. The user, instead of being trapped in the one-way flow of a piece of text can drop out at any time, whether by simply asking for a definition of a word, or by calling up a supporting visuals, text or sound. They can either follow their thoughts in that direction or return to the original text. Data democracy in action.



ICON: An on-screen symbol that represents a file or function. On the desktop, Icons are the pictures that you click on – *Impression* is represented by a quill. To activate the file or function you simply double-click on the icon. Icons can represent simple functions, files, or directories of files.



JARGON: Totally infuriating if you don't understand what any of it means. Much computer jargon is made up of acronyms – words formed using the initial letters of other words – MS-Dos, for example, is short for Microsoft Disc Operating System and Risc stands for Reduced Instruction Set Computer. If you have difficulty with many aspects of computer terminology, we recommend that you buy the *Penguin Dictionary Of Computing,* £6.99 from all good bookshops.



KILOBYTE: A basic unit of measurement for computer memory. A kilobyte (K) is often thought to be 1,000 bytes (one byte is equivalent to one character), but in actual fact it is 1,024, because this is two to the power of 10 – OK?



LOW-RESOLUTION: Output devices, such as printers or monitors, often do not produce enough dots per inch to form a perfect image. Images printed from a low-resolution printer will be grainy, and graphics are likely to have jagged edges. High-resolution devices produce brilliantly clear and precise images.



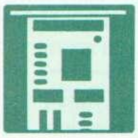
MODEM: This machine will convert bytes from your computer into acoustic telephone signals and/or translate any signals you receive from the outside world back into data. The unit is attached to a telephone and it allows computer users to communicate with each other. With a modem you can access bulletin boards or swap programs with other users.



NETWORK: A way to get computers talking to each other. A number of computers can be connected to a central file server which stores information accessable to everyone. At *BAU* we use an Econet network, so we can produce the magazine without the fuss of swapping discs or generating lots of paper. Most computer networks, fortunately, run more efficiently than the British Rail one.



OPERATING SYSTEM: A master progam that controls the computer's internal workings. An operating system is often specific to a particular machine. The Arc has Risc OS, most PCs have MS-Dos.



PODULE: A board full of electronics that fits into one of the slots inside your Arc. Podules are able to perform many functions – for example, video digitising or a sound sampling.



QUESTIONS: . . . and Answers. This regular *BAU* feature is better than any Dear Deirdre column, and it's the ultimate problem solver. If you're stuck with a piece of hardware or software – however simple the problem, write to Q&A and we will sort it out. (Erm, no personal problems, thanks!)



ROM AND RAM: The computer's working memory. Rom stands for read-only memory. It stores essential software (like the boot) which you don't want to lose when the computer is switched off. The Ram, for random access memory, doesn't retain information when the computer is switched off.



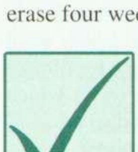
SPRITE: Not just a fizzy drink! It is a file that holds all colours and bits of a picture, just like a mosaic. Put the sprite into the correct application, like *Paint* or *Revelation* and you will be able to play around with the picture to your heart's content.



TOOLBOX: This can be found at the side of some windows. It provides menu option in graphical form. For applications such as *Draw* the toolbox makes life a lot simpler as there is no need to keep clicking on the menu button, and choosing from menus.



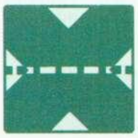
USER-FRIENDLY: If you can say this about something, it is well suited for those with little technical knowledge or computer training. Arc Menus, windows and the toolbox are all user-friendly. With these you do not need to memorise buttons and key controls. Warnings sometimes don't look friendly, but then they often pop up when you're about to do something utterly half-witted like erase four weeks work.



VERIFY: The action you must take to ensure that discs are not damaged, as sometimes they are corrupt. The computer will automatically verify a disc after formatting. If a disc continually refuses to verify, there is no hope and the magnetic data is probably destroyed so throw it away. Now!



WINDOW: Something you will encounter with most applications. The way you see a document or any other file is through a rectangular window rather than on the plain screen. Windows are user-friendly and help you to keep your work organised. Often you can have a number of windows on the screen at once which means you can view many documents or use more than one application.



X-AXIS: One of the few 'x' computing words. As all maths boffins will know, this is the horizontal axis of a graph. The X and Y axes are used in programming to tell the computer where on the screen you want to place a character.



YOU may be an expert and find this A-Z very simplistic. If so, you may know of an absolute beginner, so pass this little lexicon on to the m – they might find it useful. Did you honestly think we'd be desperate enough to use Y-axis?



ZERO: It may seem like nothing to you but it is a very important number for the computer. The computer starts counting from zero, not one like us. It is important when typing programs not to muddle zero (0) and capital O.

TONY JUDGE

STICKY MOMENTS

Mathew Tizard demonstrates the power and elegance of natural selection, with the help of his amazing 32-bit and eight-bit simulated spiders' webs

Nature is a repository of good ideas that has been raided over the ages by engineers, chemists, and specialists from all disciplines. So why not programmers? With *Web*, a program to breed the ultimate arachnid, I have used the computer to simulate some of the principles of evolution.

Living things look the way they are because they are alive. We are exactly as we are because otherwise we would be dead. If we were made differently, we would perish through being some other animal's dinner, freezing to death in winter, or a due to a whole host of other things which might very easily kill us.



We don't actually drop dead every cold January because we have evolved into warm-blooded hairy creatures who are tough enough to take it. And here is the important point: not dying means that lifeforms get to live longer, which increases the possibility of them reproducing themselves. An animal or plant becomes adapted to its role in the environment and flourishes when it stays in its optimum surroundings.

In our case, almost everything about us has at some point in the past given our species some advantage over other less fortunate creatures, and allowed us rather than them to proliferate.

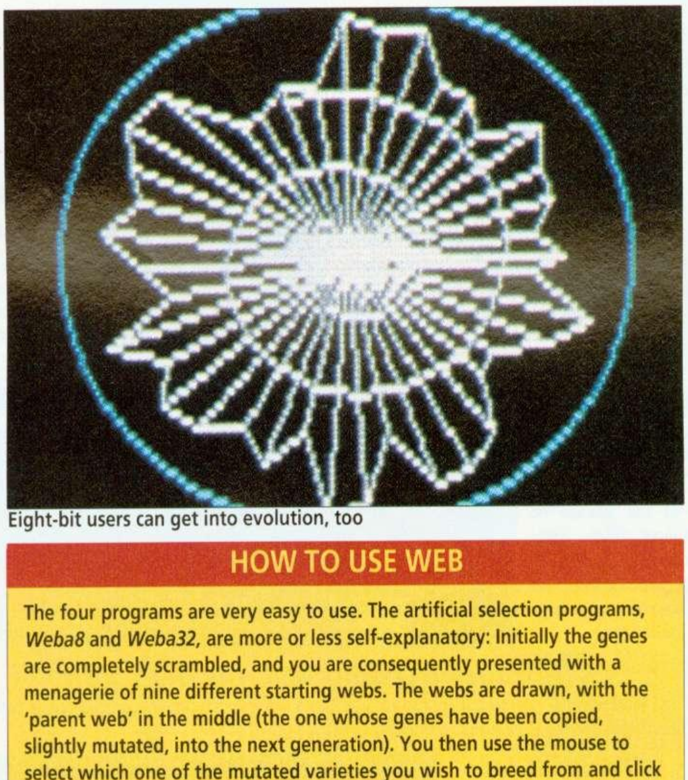
Occasionally though, heredity has an off day, or the genetic information becomes just slightly garbled when it's passed on. This is known as mutation, and leads to a finished creature which is different in some way from how it is 'supposed to be'.

Most mutations are disfiguring or crippling, but a few may actually lead to an improvement in how well adapted the creature is to its surroundings. This will in turn give the creature a greater chance to reproduce before dying, and soon the species will consist almost entirely of those individuals that possess the improvement, and it will trundle happily on until its external surroundings alter (which could be due to climate, predation, disease or whatever)

Evolution doesn't stop there; the process of improvement by accumulating many chance mutations has been happening continuously since the first self-replicating slimeball crawled out of the primeval soup. We owe that slimeball everything.

To illustrate these processes on a computer, first of all it helps if you find something that will look good on screen. I decided to use a spider's web as the subject. Although it is not an organism itself, the systematic way in which it is constructed, and the fact that the better the web is, the more likely it is for the spider who built it to survive, make it an ideal choice.

I then had to design in 'genes' that influence the

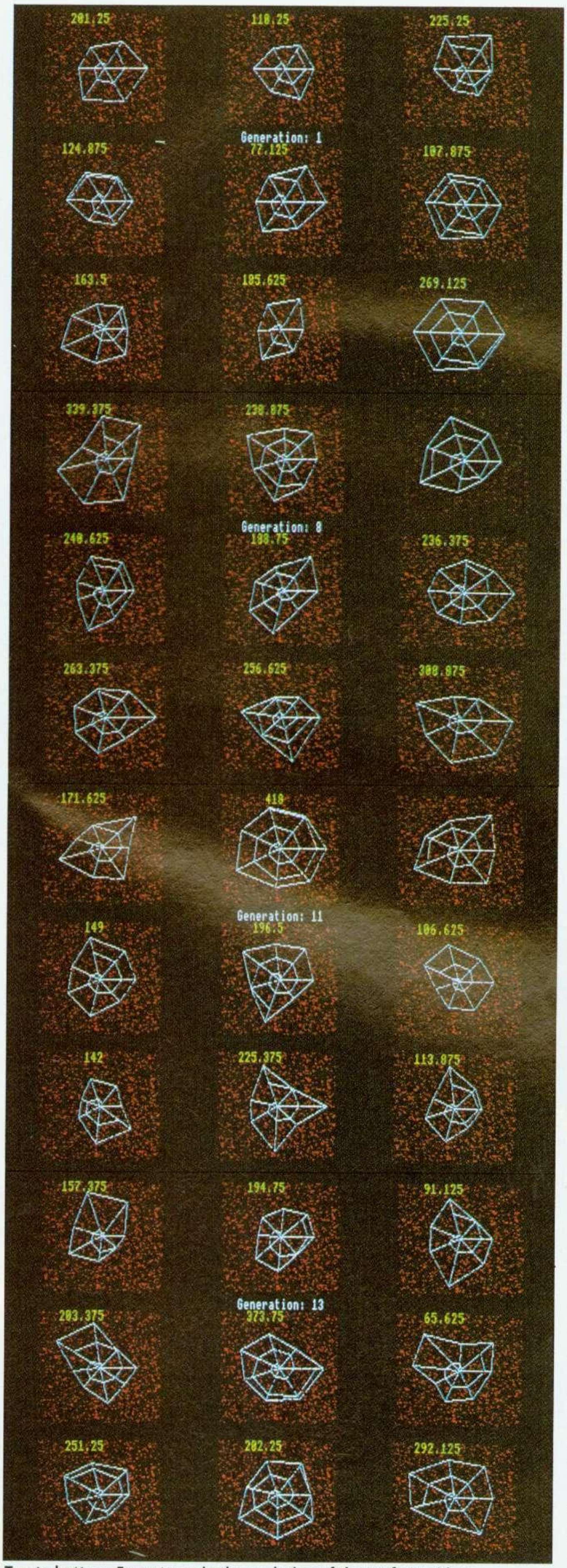


Eight-bit users can get into evolution, too

HOW TO USE WEB

The four programs are very easy to use. The artificial selection programs, *Weba8* and *Weba32*, are more or less self-explanatory: Initially the genes are completely scrambled, and you are consequently presented with a menagerie of nine different starting webs. The webs are drawn, with the 'parent web' in the middle (the one whose genes have been copied, slightly mutated, into the next generation). You then use the mouse to select which one of the mutated varieties you wish to breed from and click on it. In the eight-bit version, *Weba8*, you simply press the number corresponding to your choice. If none of the mutations seems beneficial, there is the option to reselect the parent for another brood. Your selection then moves to the centre of the screen, and the process begins all over again. Of course you have the option to breed for spikiness or smallness, just as you do for roundness and regularity.

The natural selection programs, *Webn8* and *Webn32*, require no intervention from the user at all. Webs are drawn in the same way as before, then tested for their abilities to catch 'fly' pixels. They are then given a score which is displayed on each web so you can see how they measure up to each other. The webs are sometimes surprisingly better (or worse) than you think. The computer's choice (the highest scorer) is then moved to the centre as before. There are no differences between 32-bit and eight-bit versions, except that, obviously, I can't go moving chunks of the screen around in Basic 2! To obtain the best results from this program, although it is entertaining to watch, you should leave it breeding for a few hours and then see what it has produced.



Top to bottom: Four stages in the evolution of the perfect spider

web's appearance and function. Time-lapse film studies have shown that the spider spins its web by first constructing a series of radial spokes from a hub at the centre, and then winding a spiral from the hub outwards, to produce the familiar 'dartboard' structure.

THE PROGRAM

I ended up with a computer spider that does exactly this, but in different ways, depending on its computer 'genes'. There are six of these genes grouped in pairs, and the pairs have the following functions: the first influences the way the spokes are spaced radially, the second influences how the radial shape emerges, the third gene determines how tight the internal spiral is, and the full quota of six is made up by including three gene pairs, each of which represents the upper and lower limits in variation for the regular gene-variables.

These genes are also the values which mutate at each generation, although the process of mutation has been vastly exaggerated: Instead of having a lifespan of 70 years and a low tendency to mutate, as we do, the webs have a life expectancy of only a few seconds, and they change at a much higher rate.

The natural selection program works by applying two tests to each web: An array of 'flies', shown by dots on the screen, is flung at each one and a measure of how many the web catches is registered. Set against this positive score is the total length of silk the spider uses in the web's construction. Most spiders only ever spin a handful of webs in their lifetime, so silk is a real factor – the need to manufacture silk will affect the spider's nutritional requirements, which in turn, of course, depend on how good its web is at catching flies.

These two things are then combined in the calculation of a score for each individual, and the winner gets to breed the next generation of spiders.

Computer webs converge towards the shape that we know real spiders' webs to be, because a circle is a very efficient shape: it has the maximum enclosed area for the smallest circumference, and therefore hits a happy medium between the opposing selection pressures of how good it is at catching flies (a function of its area), and how wasteful it has been in achieving that standard (a function of its circumference).

The circle (or infinite-sided polygon) has no 'wasted' areas where the spiral can't reach, and so it usually emerges as the best strategy.

If you leave it for a while, the program invariably produces a structure which is more or less circular, has regularly spaced spokes, and a combination of the spokes and the spiral which ensure an dense and efficient sticky mesh. The selection pressures of economy and hunger for flies represent the environment to which the spider's web must adapt itself.

The delicate tension between opposing selection pressures is the driving force of evolution. Using only accumulated chance, and the dumb forces of physics as tools, it teases strange and often beautiful structures out of the raw stuff of nature. If you are interested in pursuing the ideas behind this program, I recommend that you read *The Blind Watchmaker* and *The Selfish Gene*, both written by Richard Dawkins and published by Penguin Books.

IN EDUCATION

The elegance of the processes of evolution deserves to be more widely celebrated, which is why I wanted to bring this intriguing topic to a wider audience.

The suite of programs here was not written with an eye to being used a teaching aid, but they do illustrate some of the real-life processes required for some levels of the National Curriculum.

This article will have some relevance to those studying heredity and genetics from National Curriculum levels 4 to 9 (mostly at level 9).

For teachers, simulations of this sort can be used as a starting point for a classroom discussion or as a demonstration of the power of evolution. They can certainly make a particular topic come alive.

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Program	Page	BBC B B+	B+/ 128	Master 128	Master Compact	Electron	6502SP/ Turbo	ADFS	Econet	Shadow Ram	Archimedes/ A3000/A5000	Monthly disc
***INFO**												
Info 1 - 3	115							*	*		*	*
Info 4		*	*	*	*		*	*	*		*	*
Info 5 - 6								*	*		*	*
Info 7								*	*		*	*
Info 8		*	*	*	*	*		*	*		*	*
Info 9								*	*		*	*
Info 10		*	*	*	*	*	*	*	*	*	*	*
Info 11		*	*	*	*	*	*	*	*	*	*	*
Info 12		*	*	*	*			*	*	*	*	*
Info 13 -14								*	*		*	*
Assembly Line	125											
Arm1 - Arm4								*	*		*	*
Sticky Moments	132											
Weba32								*	*		*	*
Webn32								*	*		*	*
Weba8		*	*	*	*	*	*	*	*	*	*	*
Webn8		*	*	*	*	*	*	*	*	*	*	*

Typing in listings from the yellow pages.

The yellow pages are subdivided into article headings. Each article heading corresponds with its article in the magazine.

So for instance to find listing three of *INFO in the yellow pages (Circles) look for the *INFO heading, then follow the listings through until you get to listing three.

At the beginning of the program are a few lines that tell you what machines it works on. This information can also be derived from the table above.

For Archimedes owners it may not be immediately obvious how to actually type in the listings. By pressing Function key 12 you can access the command line. From here type BASIC and the Archimedes will enter the Basic language. You may like to type MODE 12, which will turn the screen to white on black.

Then simply copy each line of the program in turn after the '>' prompt, pressing RETURN when finished. Save the program onto disc by typing SAVE"<filename>". It can then be run by typing RUN. You will probably need to debug it as you may have made some typing errors.

When you have finished debugging save the program one last time. Then it can either be double-clicked upon from the desktop, or loaded using LOAD"<filename>".

A more detailed description of how to type in listings from the yellow pages appeared in BBC Acorn User, August 1992.

*INFO

Listing 1 – !RunImage

```
   10 REM >!RunImage (Info1)
   20 REM Main Auto program
   30 REM by Andrew Young
   40 REM for 32-bit machines
   50 REM (c) BAU October 1992
   60 :
   70 key$=INKEY$(0)
   80 open%=1:close%=2:app%=3:mod%=4:vdu
%=5:mode%=6
   90 SYS "Wimp_Initialise",200,&4B53415
4,"Transient"
  100 SYS "XOS_ReadVarVal","Initialise$E
xec",0,-1,0,3 TO ,,r2%
  110 IF r2%=0 THEN PROCfile("Default")
  120 IF key$>"" THEN PROCfile(key$)
  130 SYS "Wimp_CloseDown"
  140 *Set Initialise$Exec True
  150 END
  160 :
  170 DEF FNget_line(fh%)
  180 s$=""
  190 REPEAT
  200  v%=BGET#fh%
  210  s$+=CHR$v%
  220 UNTIL ((EOF#fh%) OR (v%<32))
  230 =s$
  240 :
  250 DEF FNfunc(fc$)
  260 fc$=MID$(fc$,2,LEN(fc$)-3)
  270 CASE fc$ OF
  280  WHEN "Open":nf%=open%
  290  WHEN "Close":nf%=close%
  300  WHEN "Application":nf%=app%
  310  WHEN "Module":nf%=mod%
  320  WHEN "VDU":nf%=vdu%
  330  WHEN "Mode":nf%=mode%
  340 OTHERWISE:
  350  ERROR 1,"Warning: Bad file headin
g"
  360 ENDCASE
  370 =nf%
  380 :
  390 DEF PROCvdu(vs$)
  400 REPEAT
  410  d%=INSTR(vs$,",")
  420  IF d%=0 THEN d%=LEN(vs$)
  430  v%=VAL(LEFT$(vs$,d%))
  440  VDU v%
  450  vs$=RIGHT$(vs$,LEN(vs$)-d%)
  460 UNTIL vs$=""
  470 ENDPROC
  480 :
  490 DEF PROCfile(fn$)
  500 i%=OPENIN("<Initialise$Dir>."+fn$)
  510 IF i%<>0 THEN
  520  func%=app%
  530  WHILE NOT EOF #i%
  540   st$=FNget_line(i%)
  550   IF st$<>"" THEN
  560    IF LEFT$(st$,1)="{" THEN
  570     func%=FNfunc(st$)
  580    ELSE
  590     CASE func% OF
  600       WHEN open% : OSCLI("Filer_Ope
nDir "+st$)
  610       WHEN close% : OSCLI("Filer_Cl
oseDir "+st$)
  620       WHEN app% : OSCLI("WimpTask "
+st$)
  630       WHEN mod% : OSCLI("RMLoad "+s
t$)
  640       WHEN vdu% : PROCvdu(st$)
  650       WHEN mode% : SYS "Wimp_SetMod
e",VAL(st$)
  660      ENDCASE
  670     ENDIF
  680    ENDIF
  690  ENDWHILE
  700 ENDIF
  710 CLOSE #i%
  720 ENDPROC
```

Listing 2 – MakeSpr

```
   10 REM >MakeSpr (Info2)
   20 REM Create sprite file for !Auto
   30 REM Sprites by Andrew Young
   40 REM for 32-bit machines
   50 REM (c) BAU October 1992
   60 :
   70 DIM w% 1024
   80 file$="!Sprites"
   90 READ olen%
  100 p%=0
  110 d$=""
  120 dl%=1
  130 WHILE p%<olen%
  140  b%=FNb
  150  IF b%=130:p%?w%=FNb:p%+=1
  160  IF b%>=131 AND b%<=162 THEN
  170   n%=b%-128
  180   f%=p%-FNb
  190   FOR i%=0 TO n%-1
  200    ?(w%+p%+i%)=?(w%+f%+i%)
  210   NEXT
  220   p%+=n%
  230  ENDIF
  240  IF b%<130 OR b%>162 THEN p%?w%=b%
:p%+=1
  250 ENDWHILE
  260 SYS "OS_File",0,file$,,,w%,w%+p%
  270 SYS "OS_File",1,file$,&FFFFF943,&E
942B5D3,,&3
  280 PRINT"""!Sprites"" created"
  290 END
  300 :
  310 DEF FNb
  320 LOCAL b%,c1%,c2%,i%
  330 IF d$="" THEN
  340  READ d$,c1%
  350  c2%=0
  360  FOR i%=1 TO LEN(d$)/2
  370   c2%+=EVAL("&"+MID$(d$,2*i%-1,2))
  380  NEXT
  390  IF c1%<>(c2% MOD 100) PRINT"Error
 in DATA line ";dl%:END
  400  dl%+=1
  410 ENDIF
  420 b%=EVAL("&"+LEFT$(d$,2))
  430 d$=MID$(d$,3)
  440 =b%
  450 :
  460 DATA &2E0
  470 DATA 0100000108304E4020000,82
  480 DATA D4830421617574 6F831483,3
  490 DATA 170004871C840F0783282C,59
  500 DATA 832C8083310C872087278C,76
  510 DATA 0E44448435000070778431,47
  520 DATA 8714874F778C2800BBBBBB,29
  530 DATA BBBB70835783049314 8D28,87
  540 DATA 834F8B3F865070777778A,33
  550 DATA 65857883138A7688759213,78
  560 DATA 853788A98523884A408814,91
  570 DATA 83BE83C2B084A4881485A7,74
  580 DATA 77851393148A28892C8C50,17
  590 DATA 84AE8BA990A591128DC6FF,80
  600 DATA FF0F85FBF087088514881C,54
  610 DATA 8C28832AFFFFFFF0832E83,66
  620 DATA 0493148D28834F8B3F8650,78
  630 DATA F08441896585788313 8A76,34
  640 DATA 8F9190A48D3C884A8A8B0F,99
  650 DATA 85C288A3891C8BB78A1485,4
  660 DATA 8A89288C488A1483AE9990,87
  670 DATA 88D800,52
  680 DATA *
```

Listing 3 – Circles

```
   10 REM >Circles (Info3)
   20 REM by Mark Hobson
   30 REM for 32-bit machines
   40 REM (c) BAU October 1992
   50 :
   60 ON ERROR PROCerr
   70 MODE 1
   80 OFF
   90 PROCinit
  100 PROCcircles
  110 END
  120 :
  130 DEF PROCinit
  140 ok%=0
  150 COLOUR 3,0
  160 PRINTTAB(15,15)"Thinking ..."
  170 FOR i=0 TO 255 STEP 0.1
  180  COLOUR 3,i,i,i
  190 NEXT
  200 x1%=320:y1%=320
  210 x2%=1280-320:y2%=1024-320
  220 i1%=0:i2%=0
  230 r1%=50:r2%=100
  240 s%=20
  250 DIM x1%(s%),y1%(s%),x2%(s%),y2%(s%
)
  260 a%=0
  270 FOR i=0 TO PI*2 STEP (PI*2)/s%
  280  x1%(a%)=r1%*SIN(i)
  290  y1%(a%)=r1%*COS(i)
  300  x2%(a%)=r2%*SIN(i)
  310  y2%(a%)=r2%*COS(i)
  320  a%+=1
  330 NEXT
  340 s%-=1
  350 l%=&F000
  360 DIM sa% l%
  370 sa%!0=l%
  380 sa%!8=16
  390 SYS "OS_SpriteOp",256+9,sa%
  400 FOR c=1 TO 2
  410  n$="circle"+STR$(c)
  420  SYS "OS_SpriteOp",256+15,sa%,n$,,
370,306,1
  430  SYS "OS_SpriteOp",256+60,sa%,n$
  440  IF c=1 PROCcircle(320,320,1480,40
,c) ELSE PROCcircle(1160,904,1480,40,c)
  450  SYS "OS_SpriteOp",256+60,sa%
  460  OFF
  470 NEXT
  480 sc%=1
  490 DIM col%(2,1),coli%(2,1),ncol%(2,1
)
  500 FOR i=255 TO 0 STEP -0.1
  510  COLOUR 3,i,i,i
  520 NEXT
  530 CLS
  540 FOR i=0 TO 1
  550  k=2
  560  FOR j=0 TO 2
  570   col%(j,i)=RND(255)
  580   coli%(j,i)=k
  590   k-=2
  600  NEXT
  610  COLOUR i+1,0,0,0
  620 NEXT
  630 on%=-1
```

```
 640 ok%=-1
 650 ENDPROC
 660 :
 670 DEF PROCcircles
 680 REPEAT
 690  PROCswop
 700  MOVE x1%+x1%(i1%)-420,y1%+y1%(i1%)-420
 710  i1%+=1
 720  IF i1%=s%+1 i1%=0
 730  SYS "OS_SpriteOp",256+28,sa%,"circle1",,,1
 740  MOVE x2%+x2%(i2%)-1060,y2%+y2%(i2%)-800
 750  i2%-=1
 760  IF i2%=-1 i2%=s%
 770  SYS "OS_SpriteOp",256+28,sa%,"circle2",,,3
 780  IF on% THEN
 790   a=0
 800   FOR i=0 TO 1
 810    FOR j=0 TO 2
 820     IF ncol%(j,i)<col%(j,i) ncol%(j,i)+=5:a=-1
 830     COLOUR i+1,ncol%(0,i),ncol%(1,i),ncol%(2,i)
 840    NEXT
 850   NEXT
 860   IF a=0 on%=0
 870   COLOUR 3,(ncol%(0,0)+ncol%(0,1))/2,(ncol%(1,0)+ncol%(1,1))/2,(ncol%(2,0)+ncol%(2,1))/2
 880  ELSE
 890   FOR i=0 TO 1
 900    FOR j=0 TO 2
 910     col%(j,i)+=coli%(j,i)
 920     coli%(j,i)+=(RND(200)-100)/100
 930     IF col%(j,i)>255 col%(j,i)=255:coli%(j,i)=-coli%(j,i)
 940     IF col%(j,i)<0 col%(j,i)=0:coli%(j,i)=-coli%(j,i)
 950    NEXT
 960    COLOUR i+1,col%(0,i),col%(1,i),col%(2,i)
 970   NEXT
 980   COLOUR 3,(col%(0,0)+col%(0,1))/2,(col%(1,0)+col%(1,1))/2,(col%(2,0)+col%(2,1))/2
 990  ENDIF
1000 UNTIL FALSE
1010 ENDPROC
1020 :
1030 DEF PROCcircle(x,y,r,s,c)
1040 s=s/2
1050 FOR i=r TO 0 STEP -(s*2)
1060  GCOL 3,c
1070  CIRCLE FILL x,y,i
1080  GCOL 3,0
1090  CIRCLE FILL x,y,i-s
1100 NEXT
1110 ENDPROC
1120 :
1130 DEF PROCswop
1140 SYS "OS_Byte",113,sc%
1150 sc%=sc% EOR 3
1160 WAIT
1170 SYS "OS_Byte",112,sc%
1180 CLS
1190 ENDPROC
1200 :
1210 DEF PROCerr
1220 IF ERR=17 AND ok% THEN
1230  REPEAT
1240   a=0
1250   FOR i=0 TO 1
1260    FOR j=0 TO 2
1270     IF col%(j,i)>0 col%(j,i)-=1:a=-1
1280     COLOUR i+1,col%(0,i),col%(1,i),col%(2,i)
1290    NEXT
1300   NEXT
1310   COLOUR 3,(col%(0,0)+col%(0,1))/2,(col%(1,0)+col%(1,1))/2,(col%(2,0)+col%(2,1))/2
1320  UNTIL a=0
1330 ENDIF
1340 MODE 12
1350 IF ERR<>17 REPORT:PRINT" at line ";ERL
1360 END
```

Listing 4 – Rippler

```
  10 REM >Rippler (Info4)
  20 REM by Richard Talbot-Watkins
  30 REM  & Matthew Godbolt
  40 REM for 8-bit machines
  50 REM (c) BAU October 1992
  60 :
  70 MODE 5
  80 VDU 23;8202;0;0;0;
  90 HIMEM=&3000
 100 PROCassemble
 110 REM *LOAD screen here at &5800
 120 REM if necessary.
 130 PROCdemo
 140 CALL start
 150 END
 160 :
 170 DEF PROCassemble
 180 sintab%= &700
 190 scrlo% = &900
 200 scrhi% = &A00
 210 freq=PI/32
 220 amp=6
 230 FOR N%=0 TO 255
 240 addr=&3000+(N% DIV 8)*320+(N% AND 7)
 250 N%?sintab%=SIN(N%*freq)*amp
 260 N%?scrlo%=addr MOD 256
 270 N%?scrhi%=addr DIV 256
 280 NEXT
 290 :
 300 read=&70
 310 write=&72
 320 wave=&74
 330 ypos=&75
 340 escflag=&FF
 350 :
 360 FOR N%=0 TO 2 STEP 2
 370 P%=&B00
 380 [OPT N%
 390 .start
 400 LDA #0
 410 STA wave
 420 STA ypos
 430 LDA #12
 440 STA &FE00
 450 LDA #6
 460 STA &FE01
 470 :
 480 .mainloop
 490 LDA #0
 500 STA ypos
 510 .subloop
 520 LDY ypos
 530 LDA scrlo%,Y
 540 STA write
 550 LDA scrhi%,Y
 560 STA write+1
 570 LDX wave
 580 LDA sintab%,X
 590 CLC
 600 ADC ypos
 610 TAY
 620 LDA scrlo%,Y
 630 STA read
 640 LDA scrhi%,Y
 650 CLC
 660 ADC #&28
 670 STA read+1
 680 ]
 690 FOR byte%=0 TO 255 STEP 8
 700 [OPT N%
 710 LDY #byte%
 720 LDA (read),Y
 730 STA (write),Y
 740 ]
 750 NEXT
 760 [OPT N%
 770 INC read+1
 780 INC write+1
 790 ]
 800 FOR byte%=256 TO 319 STEP 8
 810 [OPT N%
 820 LDY #byte%-256
 830 LDA (read),Y
 840 STA (write),Y
 850 ]
 860 NEXT
 870 [OPT N%
 880 INC wave
 890 INC ypos
 900 BEQ skipover
 910 JMP subloop
 920 .skipover
 930 INC wave
 940 BIT escflag
 950 BMI exit
 960 JMP mainloop
 970 .exit
 980 RTS
 990 ]
1000 NEXT
1010 ENDPROC
1020 :
1030 DEF PROCdemo
1040 VDU 19,3,4;0;
1050 FOR N%=1 TO 15
1060 GCOL 0,RND(3)
1070 PROCtri(RND(1279),RND(1023),RND(1279),RND(1023),RND(1279),RND(1023))
1080 NEXT
1090 COLOUR 131
1100 COLOUR 2
1110 PRINT TAB(2,15);"THE BAU RIPPLER!"
1120 ENDPROC
1130 :
1140 DEF PROCtri(a%,b%,c%,d%,e%,f%)
1150 MOVE a%,b%
1160 MOVE c%,d%
1170 PLOT 85,e%,f%
1180 PLOT 7,a%,b%
1190 PLOT 7,c%,d%
1200 PLOT 7,e%,f%
1210 ENDPROC
```

Listing 5 – Div10

```
  10 REM >Div10 (Info5)
  20 REM by A F Reysenback
  30 REM for 32-bit machines
  40 REM (c) BAU October 1992
  50 :
  60 MODE 0
  70 DIM div 40
  80 quo=0:b=1:c=2
  90 P%=div
 100 [
 110         ADD     quo,b,b,ASR #1
 120         ADD     quo,quo,quo,ASR #4
 130         ADD     quo,quo,quo,ASR #8
 140         ADD     quo,quo,quo,ASR #16
 150         MOV     quo,quo,ASR #4
 160         ADD     c,quo,quo,ASL #2
 170         SUB     c,b,c,ASL #1
 180         CMP     c,#10
 190         ADDGE   quo,quo,#1
 200         MOV     pc,R14
 210 ]
 220 INPUT"Number: ";B%
 230 B%=ABS(B%)
 240 PRINT;B%;" DIV 10=";USR(div)
```

Listing 6 – Mod10

```
  10 REM >Mod10 (Info6)
  20 REM by A F Reysenbach
  30 REM for 32-bit machines
  40 REM (c) BAU October 1992
  50 :
  60 MODE 0
  70 DIM mod 40
  80 a=0:b=1
  90 P%=mod
 100 [
 110         ADD     a,b,b,ASR #1
 120         ADD     a,a,a,ASR #4
 130         ADD     a,a,a,ASR #8
 140         ADD     a,a,a,ASR #16
 150         MOV     a,a,ASR #4
 160         ADD     a,a,a,ASL #2
 170         SUB     a,b,a,ASL #1
 180         CMP     a,#10
 190         SUBGE   a,a,#10
 200         MOV     pc,R14
 210 ]
 220 INPUT"Number: ";B%
 230 B%=ABS(B%)
 240 PRINT;B%;" MOD 10=";USR(mod)
 250 END
```

Listing 7 - UpTime+

```
|Type this in as an obey file, pressing RETURN¶
|only when you see the paragraph character (¶)¶
¶
BASIC -load $.!UpTime.!RunImage¶
¶
DELETE 490,500¶
DELETE 1320,1340¶
DELETE 1480,1500¶
DELETE 2260,2270¶
DELETE 2520,2530¶
DELETE 2590,2590¶
DELETE 2730,2740¶
DELETE 2910,2930¶
¶
10 REM >!RunImage v2.00¶
40 REM (c) BAU October 1992¶
460 CALL maketref¶
910 A$=GET$#chref%¶
960 SYS "OS_ConvertHex8",lo%,result%,buffsize% TO ,zeroptr%¶
980 BPUT#chref%,A$+$result%¶
1060 BPUT#chref%,A$+STRING$(spos%-LEN(A$)-1," ")+"&"+STRING$(10,"0")¶
1070 lo%=0:hi%=0¶
1590 Version$="2.00"¶
2460 EQUD    lo%¶
2470 EQUD    hi%¶
2490 EQUD    &39ADA00¶
2600 EQUD    0¶
¶
461 lo%=!dt:hi%=!(dt+4)¶
911 lo%=EVAL("&"+RIGHT$(A$,8))¶
912 hi%=EVAL("&"+LEFT$(A$,2))¶
951 SYS "OS_ConvertHex2",hi%,result%,buffsize% TO ,zeroptr%¶
952 ?zeroptr%=13:A$=$result%¶
1461 LDR     R2,wkmin¶
1462 MOV     R3,#0¶
2241 LDR     R2,offset¶
2242 LDR     R3,offset+4¶
2761 STR     R0,dt¶
2762 STR     R1,dt+4¶
¶
SAVE"$.!UpTime.!RunImage"¶
QUIT¶

WIPE $.!UpTime.UpTimeRef ~C¶
```

Listing 8 – Water+

```
  52 REM Load/Save DCA October 1992
1030 IF INKEY-99 PROClines
1092 IF INKEY-82 PROCsave
1094 IF INKEY-87 PROCload
1095 IF INKEY-2 AND INKEY-52 CALL remove:CALL setup
1096 IF INKEY-2 AND INKEY-83 CALL remove:CALL setup:CLS:PROCscreen:GCOL 3,7
1160 REPEAT UNTIL NOT INKEY-99
1270 UNTIL INKEY-99
1310 REPEAT UNTIL NOT INKEY-99
1510 :
1520 DEF PROCsave
1530 REPEAT UNTIL NOT INKEY-82
1540 *FX 21
1550 file%=GET AND &DF
1560 IF file%<ASC"A" OR file%>ASC"Z" ENDPROC
1562 CALL remove
1563 CALL setup
1564 ON ERROR VDU 7:GOTO 140
1570 OSCLI("SAVE WetPic"+CHR$file%+" 3000 +5000")
1571 OSCLI("SAVE Valves"+CHR$file%+" 82 +C")
1572 ON ERROR PROCerror:GOTO 150
1580 ENDPROC
1590 :
1600 DEF PROCload
1610 REPEAT UNTIL NOT INKEY-87
1620 *FX 21
1630 file%=GET AND &DF
1640 IF file%<ASC"A" OR file%>ASC"Z" ENDPROC
1641 CALL remove
1650 CALL setup
1651 ON ERROR VDU 7:GOTO 140
1660 OSCLI("LOAD WetPic"+CHR$file%)
1661 OSCLI("LOAD Valves"+CHR$file%)
1662 ON ERROR PROCerror:GOTO 150
1670 ENDPROC
```

Listing 9 – CIE

```
  10 REM >CIE (Info9)
  20 REM by David Walters
  30 REM for 32-bit machines
  40 REM (c) BAU November 1992
  50 :
  60 MODE 15
  70 OFF
  80 DIM m1(2), m2(2,2), col%(2), err%(2)
  90 size%=300
 100 k=3/size%
 110 m2()=k,0,-k,0,k,-k,0,0,3
 120 err%()=0
 130 r%=0
 140 g%=1
 150 b%=2
 160 FOR y%=0 TO size% STEP 4
 170  FOR x%=0 TO size%-y% STEP 2
 180   m1()=x%,y%,1
 190   m1()=m1().m2()
 200   max=0
 210   FOR i%=0 TO 2
 220    IF m1(i%)>max max=m1(i%)
 230   NEXT
 240   FOR i%=r% TO b%
 250    col%(i%)=m1(i%)/(max/15)+.5
 260   NEXT
 270   C%=FNset_col(col%(r%),col%(g%),col%(b%))
 280   POINT x%,y%
 290   PROCett
 300   POINT x%+size%,y%
 310  NEXT
 320 NEXT
 330 END
 340 :
 350 DEF PROCett
 360 T%=(C% AND %11)
 370 errflag%=FALSE
 380 FOR i%=r% TO b%
 390  err%(i%)+=col%(i%)-((C%>>(i%*2+2)) AND 3)*4-T%
 400  IF ABSerr%(i%)>=4 errflag%=TRUE
 410 NEXT
 420 IF errflag% THEN
 430  FOR i%=r% TO b%
 440   col%(i%)+=err%(i%)
 450   IF col%(i%)>15 col%(i%)=15 ELSE IF col%(i%)<0 col%(i%)=0
 460  NEXT
 470  C%=FNset_col(col%(r%),col%(g%),col%(b%))
 480  err%()=0
 490 ENDIF
 500 ENDPROC
 510 :
 520 DEF FNset_col(r%,g%,b%)
 530 LOCAL T%,G%
 540 T%=((r% OR g% OR b%) AND 3)*64
 550 G%=(b% AND 12)*4+(g% AND 12)+r%/4
 560 GCOL 0,G% TINT T%
 570 =(G%<<2)+T%/64
```

Listing 10 – FXDemo1

```
  10 REM >FXdemo1 (Info10)
  20 REM Without procedures
  30 REM by DCA
  40 REM for all machines
  50 REM (c) BAU October 1992
  60 :
  70 MODE 4
  80 DIM q% 10
  90 ital%=FALSE
 100 bold%=FALSE
 110 osword=&FFF1
 120 REPEAT
 130  READ r$
 140  IF r$="*" GOTO 310
 150  REPEAT
```

```
  160   c$=LEFT$(r$,1)
  170   special%=c$="@"
  180   IF special% THEN c$=MID$(r$,2,1)
:r$=MID$(r$,3):IF c$="I" ital%=NOT ital%
 ELSE IF c$="B" bold%=NOT bold%
  190   IF special% GOTO 290
  200   ?q%=ASC(c$)
  210   X%=q% MOD 256
  220   Y%=q% DIV 256
  230   A%=10
  240   CALL osword
  250   IF bold% FOR i%=1 TO 8:q%?i%=q%?
i% OR (q%?i%/2):NEXT
  260   IF ital% FOR i%=1 TO 2:q%?i%=q%?
i%/2:NEXT:FOR i%=6 TO 8:q%?i%=q%?i%*2:NE
XT
  270   VDU 23,224,q%!1;q%!3;q%!5;q%!7;2
24
  280   r$=MID$(r$,2)
  290  UNTIL r$=""
  300  PRINT'
  310 UNTIL r$="*"
  320 END
  330 :
  340 DATA "This program displays @Iital
icised@I"
  350 DATA "and @Bbold@B characters."
  360 DATA "@I@BThese are bold italics!@
B@I"
  370 DATA "*"
```

Listing 11 – FXDemo2

```
   10 REM >FXdemo2 (Info11)
   20 REM Without procedures
   30 REM by DCA
   40 REM for all machines
   50 REM (c) BAU October 1992
   60 :
   70 MODE 4
   80 PROCinit
   90 PROCtext
  100 END
  110 :
  120 DEF PROCinit
  130 DIM q% 10
  140 ital%=FALSE
  150 bold%=FALSE
  160 osword=&FFF1
  170 ENDPROC
  180 :
  190 DEF PROCtext
  200 LOCAL r$
  210 REPEAT
  220  READ r$
  230  IF r$<>"*" PROCdisplay_line(r$)
  240 UNTIL r$="*"
  250 ENDPROC
  260 :
  270 DEF PROCdisplay_line(r$)
  280 REPEAT
  290  IF LEFT$(r$,1)="@" r$=FNeffect(r$
) ELSE r$=FNchar(r$)
  300 UNTIL r$=""
  310 PRINT'
  320 ENDPROC
  330 :
  340 DEF FNeffect(r$)
  350 IF MID$(r$,2,1)="I" ital%=NOT ital
%
  360 IF MID$(r$,2,1)="B" bold%=NOT bold
%
  370 =MID$(r$,3)
  380 :
  390 DEF FNchar(r$)
  400 ?q%=ASC(r$)
  410 X%=q% MOD 256
  420 Y%=q% DIV 256
  430 A%=10
  440 CALL osword
  450 IF bold% PROCmake_bold(q%)
  460 IF ital% PROCmake_italic(q%)
  470 VDU 23,224,q%!1;q%!3;q%!5;q%!7;224
  480 =MID$(r$,2)
  490 :
  500 DEF PROCmake_bold(a%)
  510 LOCAL i%
  520 FOR i%=1 TO 8
  530  a%?i%=a%?i% OR (q%?i%/2)
  540 NEXT
  550 ENDPROC
  560 :
  570 DEF PROCmake_italic(a%)
  580 LOCAL i%
  590 FOR i%=1 TO 2
  600  a%?i%=a%?i%/2
  610 NEXT
  620 FOR i%=6 TO 8
  630  a%?i%=a%?i%*2
  640 NEXT
  650 ENDPROC
  660 :
  670 DATA "This program displays @Iital
icised@I"
  680 DATA "and @Bbold@B characters."
  690 DATA "@I@BThese are bold italics!@
B@I"
  700 DATA "*"
```

Listing 12 – Chat

```
   10 REM >Chat (Info12)
   20 REM by DA and DL
   30 REM for all machines (with Econet)
   40 REM (c) BAU October 1992
   50 :
   60 PROCinit
   70 me$=FNwhoami
   80 INPUT "Chat to whom ? "you$
   90 IF you$="" PROCreply ELSE PROCchat
  100 MODE 7
  110 PROCscreen
  120 PROCchatter
  130 MODE 7
  140 END
  150 :
  160 DEF PROCinit
  170 DIM qr% &100,qt% &100,q% &800,temp
% &100,in% &100,out% &100
  180 osbyte=&FFF4
  190 osword=&FFF1
  200 tr_idle%=TRUE
  210 rec_idle%=TRUE
  220 port%=&E0
  230 DIM x%(1),y%(1)
  240 ENDPROC
  250 :
  260 DEF FNwhoami
  270 !q%=0
  280 q%!4=0
  290 q%?1=8
  300 q%?3=32
  310 PROCosword(q%,&14)
  320 =FNuc($(q%+4))
  330 :
  340 DEF PROCscreen
  350 FOR i%=0 TO 22
  360  VDU 31,0,i%,145,255,135,31,38,i%,
145,255
  370 NEXT
  380 FOR i%=0 TO 22 STEP 11
  390  VDU 31,0,i%,129,157
  400 NEXT
  410 ENDPROC
  420 :
  430 DEF PROCchatter
  440 cur%=-1
  450 $out%=CHR$254+RIGHT$("000"+STR$~th
ere%,4)+me$
  460 PROCbegin_receive(0,1000)
  470 PROCbegin_transmit(there%)
  480 out$=""
  490 last%=TIME
  500 rec_ok%=FALSE
  510 *FX 229,1
  520 done%=FALSE
  530 gone%=FALSE
  540 PROCwindow(0)
  550 REPEAT
  560  c$=INKEY$(0)
  570  IF c$=CHR$27 done%=TRUE:out$=c$
  580  IF c$=CHR$13 c$=CHR$255
  590  IF c$<>"" AND NOT done% PROCinser
t(0,c$):out$=out$+c$
  600  IF tr_idle% AND (LEN(out$)>5 OR (
TIME>last%+30 AND out$<>"")) AND NOT gon
e% THEN $out%=out$:PROCbegin_transmit(th
ere%):last%=TIME:out$=""
  610  PROCprocess_transmit
  620  PROCprocess_receive
  630  IF rec_idle% PROCgot_chars
  640 UNTIL done% AND tr_idle%
  650 IF NOT rec_idle% A%=&34:X%=rx%:CAL
L osbyte
  660 *FX 229,0
  670 ENDPROC
  680 :
  690 DEF PROCgot_chars
  700 IF rec_ok% in$=$in%
  710 PROCbegin_receive(0,1000)
  720 IF NOT rec_ok% ENDPROC
  730 IF ASC(in$)=254 PRINTCHR$26;TAB(2,
0)CHR$130;me$" on "FNsn(EVAL("&"+MID$(in
$,2,4)))TAB(2,11)CHR$134MID$(in$,6)" on
"FNsn(there%):PROCwindow(1):PROCwindow(0
):ENDPROC
  740 IF ASC(in$)=27 gone%=TRUE:in$=CHR$
255+"("+you$+" has gone)"+CHR$255+CHR$7
  750 IF in$<>id$ PROCinsert(1,in$)
  760 ENDPROC
  770 :
  780 DEF FNsn(n%)=STR$(n% DIV 256)+"."+
RIGHT$("000"+STR$(n% AND 255),3)
  790 :
  800 DEF PROCinsert(n%,m$)
  810 PROCwindow(n%)
  820 IF INSTR(m$,CHR$255)=0 PRINT m$;:P
ROCwindow(0):ENDPROC
  830 FOR i%=1 TO LEN(m$)
  840  IF MID$(m$,i%,1)=CHR$255 PRINT EL
SE PRINT MID$(m$,i%,1);
  850 NEXT
  860 PROCwindow(0)
  870 ENDPROC
  880 :
  890 DEF PROCwindow(n%)
  900 IF n%=cur% ENDPROC
  910 PROCpreserve(cur%)
  920 VDU 23;10,82+173*n%,0;0;0;0;28,3,1
0+11*n%,37,1+11*n%,31,x%(n%),y%(n%)
  930 cur%=n%
  940 ENDPROC
  950 :
  960 DEF PROCpreserve(n%)
  970 IF n%>=0 x%(n%)=POS:y%(n%)=VPOS
  980 ENDPROC
  990 :
 1000 DEF PROCchat
 1010 you$=FNuc(you$)
 1020 id$=FNcrc(you$)
 1030 u%=0
 1040 found%=FALSE
 1050 REPEAT
 1060  user$=FNuser
 1070  IF you$=user$ PROCnotify(uid%,"("
+me$+" wants a chat)"):found%=TRUE
 1080 UNTIL user$=""
 1090 IF NOT found% PRINT "No such user"
:END
 1100 PRINT "Ringing ";you$;"..."
 1110 IF NOT FNwait_for(id$,2000) PRINT"
No reply":END
 1120 PROCdelay(100)
 1130 PROCburst_transmit(id$,100)
 1140 ENDPROC
 1150 :
 1160 DEF FNuser
 1170 !q%=0:q%!4=0
 1180 q%?1=32
 1190 q%?3=15
 1200 q%?7=u%
 1210 q%?8=1
 1220 PROCosword(q%,&14)
 1230 IF q%?4=0 THEN =""
 1240 u%=u%+1
 1250 uid%=q%!5 AND &FFFF
 1260 =$(q%+7)
 1270 :
 1280 DEF PROCreply
 1290 id$=FNcrc(me$)
 1300 PROCburst_transmit(id$,100)
 1310 IF NOT FNwait_for(id$,200) PRINT "
Must have been a ghost!":END
 1320 ENDPROC
 1330 :
 1340 DEF PROCburst_transmit(str$,t%)
 1350 burst_time=TIME+t%
 1360 $out%=LEFT$(str$,7)
 1370 REPEAT
 1380  PROCbegin_transmit(&FFFF)
 1390  REPEAT
 1400   PROCprocess_transmit
 1410  UNTIL tr_idle%
 1420 UNTIL TIME>burst_time
 1430 ENDPROC
 1440 :
 1450 DEF FNwait_for(str$,t%)
 1460 wait_timeout=TIME+t%
 1470 got%=FALSE
 1480 REPEAT
 1490  $in%="*******"
 1500  PROCbegin_receive(0,50)
 1510  REPEAT
 1520   PROCprocess_receive
 1530  UNTIL rec_idle%
 1540  IF rec_ok% THEN IF $in%=str$ got%
=TRUE:there%=qr%!3 AND &FFFF
 1550 UNTIL got% OR TIME>wait_timeout
 1560 =got%
 1570 :
 1580 DEF PROCbegin_transmit(s%)
 1590 PROCdelay(10)
 1600 REPEAT
 1610  PROCprocess_transmit
 1620 UNTIL tr_idle%
 1630 qt%?1=port%
 1640 qt%!2=s%
 1650 IF s%=&FFFF THEN $(qt%+4)=$out% EL
SE qt%!4=out%:qt%!8=out%+LEN($out%)+1
 1660 tr_tries%=0
 1670 PROCtransmit_go
 1680 ENDPROC
 1690 :
 1700 DEF PROCbegin_receive(s%,t%)
 1710 PROCdelay(10)
 1720 rec_timeout%=TIME+t%
 1730 REPEAT
 1740  PROCprocess_receive
 1750 UNTIL rec_idle%
 1760 !qr%=&7F00
 1770 qr%?2=port%
 1780 qr%!3=s%
 1790 qr%!5=in%
 1800 qr%!9=in%+&100
 1810 PROCosword(qr%,&11)
 1820 rx%=?qr%
 1830 rec_idle%=FALSE
 1840 ENDPROC
 1850 :
 1860 DEF PROCtransmit_go
 1870 tr_idle%=FALSE
 1880 REPEAT
 1890  ?qt%=&80
 1900  PROCosword(qt%,&10)
 1910 UNTIL ?qt%<>0
 1920 ENDPROC
 1930 :
 1940 DEF PROCprocess_transmit
 1950 IF tr_idle% ENDPROC
 1960 A%=&32
 1970 U%=USR(osbyte)
 1980 IF (U% AND &8000)<>0 ENDPROC
 1990 tr_idle%=TRUE
 2000 txresult%=(U% AND &FF00) DIV &100
 2010 IF txresult%=0 tr_ok%=TRUE:ENDPROC
 2020 nonfatal%=(txresult%=&41 OR txresu
lt%=&42)
 2030 IF nonfatal% PROCdelay(50):tr_trie
s%=tr_tries%+1
 2040 IF nonfatal% AND tr_tries%<10 PROC
transmit_go ELSE tr_ok%=FALSE
 2050 ENDPROC
 2060 :
 2070 DEF PROCprocess_receive
 2080 IF rec_idle% ENDPROC
 2090 X%=rx%
 2100 IF TIME>rec_timeout% rec_idle%=TRU
E:rec_ok%=FALSE:A%=&34:CALL osbyte:ENDPR
OC
 2110 A%=&33
 2120 IF (USR(osbyte) AND &8000)<>0 THEN
 ?qr%=rx%:PROCosword(qr%,&11):rec_idle%=
TRUE:rec_ok%=TRUE
 2130 ENDPROC
 2140 :
 2150 DEF PROCosword(q%,A%)
 2160 X%=q% MOD 256
 2170 Y%=q% DIV 256
 2180 CALL osword
 2190 ENDPROC
 2200 :
 2210 DEF FNuc(s$)
 2220 $temp%=s$
 2230 i%=temp%
 2240 REPEAT
 2250  IF ?i%>=ASC"a" AND ?i%<=ASC"z" ?i
%=?i%-32
 2260  IF ?i%<=32 ?i%=13 ELSE i%=i%+1
 2270 UNTIL ?i%<32
 2280 =$temp%
 2290 :
 2300 DEF PROCnotify(s%,m$)
 2310 ?q%=1
 2320 q%!1=s%
 2330 $(q%+3)=m$+CHR$7+CHR$0
 2340 PROCosword(q%,&14)
 2350 ENDPROC
 2360 :
 2370 DEF PROCdelay(t%)
 2380 t%=TIME+t%
 2390 REPEAT UNTIL TIME>t%
 2400 ENDPROC
 2410 :
 2420 DEF FNcrc(s$)
 2430 LOCAL i%,crc%
 2440 FOR i%=1 TO LEN(s$)
 2450  crc%=crc%+ASCMID$(s$,i%)*i%
 2460 NEXT
 2470 =CHR$255+RIGHT$("000"+STR$~crc%,4)
```

Listing 13 – Eye

```
   10 REM >Eye (Info13)
   20 REM by Jan Vibe
   30 REM for 32-bit machines
   40 REM (c) BAU October 1992
   50 :
   60 MODE 137
   70 MODE 9
   80 OFF
   90 delay%=30
  100 s1%=1
  110 s2%=2
  120 ON ERROR GOTO 640
  130 DIM sp% &10000,sc% &10
  140 sp%!0=&10000
  150 sp%!4=0
  160 sp%!8=16
  170 sp%!12=16
  180 FOR n%=0 TO 15
  190  COLOUR n%,16*n%,00*n%,16*(15-n%)
  200 NEXT
  210 f=1.3416
  220 a1=1280
  230 c%=0
  240 REPEAT
  250  a2=a1/f
  260  a3=a2/f
  270  s=(a3-a1)/15
  280  FOR n%=0 TO 15
  290   GCOL n%
  300   ELLIPSE FILL 640,512,a1+n%*s,a2
  310  NEXT
  320  a1+=15*s
  330  s=s/f
  340  FOR n%=1 TO 14
  350   GCOL 15-n%
  360   ELLIPSE FILL 640,512,a1,a2+n%*s
  370  NEXT
  380 UNTIL a1<=4
  390 SYS "OS_SpriteOp",256+16,sp%,"PIC"
,0,0,0,1279,1024
  400 :
  410 REPEAT
  420  k=1000
  430  sc%!00=k
  440  sc%!04=k
  450  sc%!08=k
  460  sc%!12=k
  470  REPEAT
  480   WAIT
  490   SYS 6,112,s1%
  500   SYS 6,113,s2%
  510   SWAP s1%,s2%
  520   CLS
  530   xp%=640-(1280*k/1000)/2
  540   yp%=512-(1024*k/1000)/2
  550   SYS "OS_SpriteOp",256+52,sp%,"PI
C",xp%,yp%,8,sc%
  560   k=k+80
  570   sc%!00=k
  580   sc%!04=k
  590   WHILE TIME<delay%
  600   ENDWHILE
  610   TIME=0
  620  UNTIL k>=1800
```

►

```
 630 UNTIL FALSE
 640 SYS 6,112,s1%
 650 PRINT REPORT$" at line "STR$ERL
 660 ON
 670 END
```

Listing 14 – Eggs

```
  10 REM >Eggs (Info14)
  20 REM by Jan Vibe
  30 REM for 32-bit machines
  40 REM (c) BAU October 1992
  50 :
  60 MODE 137
  70 MODE 9
  80 OFF
  90 s1%=1
 100 s2%=2
 110 :
 120 a%=Ø
 130 FOR n%=1 TO 12
 140  f%=3Ø*n%
 150  COLOUR n%,127*(SINRADf%+1),127*(S
INRAD(f%+12Ø)+1),127*(SINRAD(f%+24Ø)+1)
 160 NEXT
 170 COLOUR 13,255,255,255
 180 c%=Ø
 190 ON ERROR GOTO 37Ø
 200 REPEAT
 210  WAIT
 220  SYS "OS_Byte",112,s1%
 230  SYS "OS_Byte",113,s2%
 240  SWAP s1%,s2%
 250  CLS
 260  c%=c% MOD 12+1
 270  FOR n%=3Ø TO 36Ø STEP 3Ø
 280   t=RAD(a%+n%)
 290   c%=c% MOD 12+1
 300   GCOL c%
 310   ELLIPSE 64Ø+4ØØ*SIN(t),512+4ØØ*C
OS(t),11Ø,64,1Ø*t
 320  NEXT
 330  GCOL 13
 340  ELLIPSE 64Ø,512,28Ø,33Ø,-12*RAD(a
%)
 350  a%=(a%+1) MOD 36Ø
 360 UNTIL FALSE
 370 SYS "OS_Byte",112,s1%
 380 PRINT REPORT$" at line "STR$ERL
 390 ON
```

ASSEMBLY LINE

Listing 1 – Arm1

```
  10 REM >ARM1
  20 REM By Dave Lawrence
  30 REM For 32 bit machines
  40 REM (C) BAU October 1992
  50 :
  60 DIM code 1ØØ
  70 link=14
  80 pc=15
  90 FOR pass=Ø TO 2 STEP 2
 100 P%=code
 110 [OPT pass
 120 .load
 130         ADR     R1,table
 140         LDR     RØ,[R1,RØ]
 150
 160         MOV     pc,link
 170
 180 .table  EQUD &ØØØØØØØØ
 190         EQUD &ØØØØØØØ1
 200         EQUD &ØØØØØØ22
 210         EQUD &ØØØØØ333
 220         EQUD &ØØØØ4444
 230         EQUD &ØØØ55555
 240         EQUD &ØØ666666
 250         EQUD &Ø7777777
 260 ]NEXT
 270 FOR i=Ø TO 7
 280  A%=i*4
 290  PRINT i,~USR(load)
 300 NEXT i
```

Listing 2 – Arm2

```
  10 REM >ARM2
  20 REM By Dave Lawrence
  30 REM For 32 bit machines
  40 REM (C) BAU October 1992
  50 :
  60 DIM code 1ØØ
  70 link=14
  80 pc=15
  90 FOR pass=Ø TO 2 STEP 2
 100 P%=code
 110 [OPT pass
 120 .sum
 130         MOV     R2,#Ø
 140         MOV     R3,#Ø
 150 .loop
 160         LDR     R4,[RØ,R2,ASL #2]
 170         ADD     R3,R3,R4
 180
 190         ADD     R2,R2,#1
 200         CMP     R2,R1
 210         BNE     loop
 220
 230         MOV     RØ,R3
 240
 250         MOV     pc,link
 260 ]NEXT
 270 numbers=1Ø
 280 total=Ø
 290 DIM data numbers*4
 300 PRINT "Numbers     : ";
 310 FOR i=Ø TO numbers-1
 320  n=RND(1ØØ)
 330  data!(i*4)=n
 340  total+=n
 350  PRINT;n;" ";
 360 NEXT i
 370 PRINT'"BASIC total : ";total
 380 A%=data
 390 B%=numbers
 400 PRINT"ARM total   : ";USR(sum)
```

Listing 3 – Arm3

```
  10 REM >ARM3
  20 REM By Dave Lawrence
  30 REM For 32 bit machines
  40 REM (C) BAU October 1992
  50 :
  60 DIM code 1ØØ
  70 array=Ø
  80 number=1
  90 count=2
 100 total=3
 110 value=4
 120 link=14
 130 pc=15
 140 FOR pass=Ø TO 2 STEP 2
 150 P%=code
 160 [OPT pass
 170 .sum
 180         MOV     count,#Ø
 190         MOV     total,#Ø
 200 .loop
 210         LDR     value,[array,count
,ASL #2]
 220         ADD     total,total,value
 230
 240         ADD     count,count,#1
 250         CMP     count,number
 260         BNE     loop
 270
 280         MOV     RØ,total
 290
 300         MOV     pc,link
 310 ]NEXT
 320 numbers=1Ø
 330 total=Ø
 340 DIM data numbers*4
 350 PRINT "Numbers     : ";
 360 FOR i=Ø TO numbers-1
 370  n=RND(1ØØ)
 380  data!(i*4)=n
 390  total+=n
 400  PRINT;n;" ";
 410 NEXT i
 420 PRINT'"BASIC total : ";total
 430 A%=data
 440 B%=numbers
 450 PRINT"ARM total   : ";USR(sum)
```

Listing 4 – Arm4

```
  10 REM >ARM4
  20 REM By Dave Lawrence
  30 REM For 32 bit machines
  40 REM (C) BAU October 1992
  50 :
  60 DIM code 1ØØ
  70 array=Ø
  80 number=1
  90 i=2
 100 j=3
 110 min=4
 120 minval=5
 130 value=6
 140 link=14
 150 pc=15
 160 FOR pass=Ø TO 2 STEP 2
 170 P%=code
 180 [OPT pass
 190 .sort
 200         MOV     i,#Ø
 210 .loop1
 220         LDR     minval,[array,i,AS
L #2]
 230         MOV     min,i
 240         MOV     j,i
 250 .loop2
 260         LDR     value,[array,j,ASL
 #2]
 270         CMP     value,minval
 280         MOVLT   minval,value
 290         MOVLT   min,j
 300
 310         ADD     j,j,#1
 320         CMP     j,number
 330         BNE     loop2
 340
 350         CMP     i,min
 360         LDRNE   value,[array,i,ASL
 #2]
 370         STRNE   value,[array,min,A
SL #2]
 380         STRNE   minval,[array,i,AS
L #2]
 390
 400         ADD     i,i,#1
 410         CMP     i,number
 420         BNE     loop1
 430
 440         MOV     pc,link
 450 ]NEXT
 460 numbers=15
 470 DIM data numbers*4
 480 FOR i=Ø TO numbers-1
 490  n=RND(1ØØ)
 500  data!(i*4)=n
 510 NEXT i
 520 PRINT "Unsorted : ";FNnumbers(data
,numbers)
 530 A%=data
 540 B%=numbers
 550 CALL sort
 560 PRINT "Sorted   : ";FNnumbers(data
,numbers)
 570 END
 580 :
 590 DEF FNnumbers(a,b)
 600 FOR i=Ø TO b-1
 610  PRINT ;a!(i*4);" ";
 620 NEXT
 630 =""
```

STICKY MOMENTS

Listing 1 – WebA32

```
   10 REM Weba32
   20 REM Spider web generator
   30 REM by Mathew Tizard
   40 REM (C) BAU Oct 92
   50 REM For 32-bit only
   60 :
   70 MODE 12:REM USE MODE 2Ø IF YOU HAV
E A MULTISYNC
   80 OFF
   90 *FX9
  100 firstflag=Ø
  110 COLOUR1,1ØØ,Ø,Ø
  120 DIM radius(15Ø),angle(15Ø)
  130 DIM gene(6,9),extreme(6),mutate(6)
  140 FORN=1TO6
  150 READ extreme(N)
  160 NEXT
  170 FORN=1TO6
  180 READ mutate(N)
  190 NEXT
  200 :
  210 REM INITIALLY RANDOM MENAGERIE
  220 FORN=1 TO 9
  230 FORG=1 TO 6 STEP 2
  240 gene(G,N)=FNR(extreme(G),extreme(G
+1))
  250 gene(G+1,N)=FNR(extreme(G),extreme
(G+1))
  260 NEXT
  270 NEXT
  280 :
  290 REM MAIN LOOP
  300 prespos=Ø
  310 PROCmutate
  320 FORWY%=16Ø TO 1Ø23 STEP 35Ø
  330 FOREX%=16Ø TO 128Ø STEP 45Ø
  340 prespos+=1
  350 OX=Ø
  360 OY=Ø
  370 MR=15Ø
  380 ORIGIN EX%,WY%
  390 GCOL 6
  400 IF prespos=5 AND firstflag=1 THEN
NEXTEX%
  410 CIRCLE Ø,Ø,MR
  420 GCOL7
  430 string%=75ØØ
  440 increm=FNR(gene(1,prespos),gene(2,
prespos))
  450 angle=Ø
  460 R=Ø
  470 REPEATR+=1
  480 anginc=FNR(gene(3,prespos),gene(4,
prespos))
  490 angle+=anginc
  500 IF angle>36Ø-(anginc/2) THEN angle
=36Ø
  510 angle(R)=angle
  520 radius(R)=FNR(gene(5,prespos),gene
(6,prespos))
  530 TX=COSRAD(angle)*radius(R)
  540 TY=SINRAD(angle)*radius(R)
  550 PROCL(OX,OY,TX,TY)
  560 PROCL(Ø,Ø,TX,TY)
  570 IF angle=36Ø THEN PROCL(TX,TY,FX,F
Y)
  580 OX=TX
  590 OY=TY
  600 IF R=1 THEN FX=TX:FY=TY
  610 UNTIL angle=36Ø
  620 MAXN=R
  630 OX=Ø
  640 OY=Ø
  650 N=Ø
  660 R=Ø
  670 REPEAT N+=1
  680 R+=increm
  690 IF N>MAXN THEN N=1
  700 X=COSRAD(angle(N))*R
  710 Y=SINRAD(angle(N))*R
  720 IF R>radius(N) THEN UNTILR>radius(
N):GOTO 77Ø
  730 PROCL(OX,OY,X,Y)
  740 OX=X
  750 OY=Y
  760 UNTIL string%<Ø
  770 NEXTEX%,WY%
  780 firstflag=1
  790 :
  800 REM ARTIFICIAL SELECTION
  810 ORIGIN Ø,Ø
  820 GCOL4,Ø
  830 REPEATMOUSE X,Y,Z
  840 XP=1+INT(X/45Ø)
  850 YP=1+INT(Y/35Ø)
  860 gridp=XP+3*(YP-1)
  870 CIRCLE 16Ø+(45Ø*(XP-1)),16Ø+(35Ø*(
YP-1)),MR
  880 REPEAT MOUSE NX,NY,Z
  890 NXP=1+INT(NX/45Ø)
  900 NYP=1+INT(NY/35Ø)
  910 IF Z<>Ø THEN UNTILZ<>Ø:GOTO94Ø
  920 UNTIL NXP<>XP OR NYP<>YP
  930 CIRCLE 16Ø+(45Ø*(XP-1)),16Ø+(35Ø*(
YP-1)),MR
  940 UNTIL Z<>Ø
  950 GCOLØ
  960 RECTANGLE FILL Ø,Ø,128Ø,35Ø*(YP-1)
  970 RECTANGLE FILL Ø,35Ø*(YP-1)+325,12
8Ø,1Ø24
  980 RECTANGLE FILL Ø,Ø,45Ø*(XP-1),1Ø24
  990 RECTANGLE FILL 45Ø*(XP-1)+325,Ø,12
8Ø,1Ø24
 1000 GCOL1
 1010 FILL 45Ø*(XP-1)+12,35Ø*(YP-1)+16Ø
 1020 IX=45Ø*(XP-1)
 1030 IY=35Ø*(YP-1)
 1040 XS=(45Ø-IX)/2Ø
 1050 YS=(35Ø-IY)/2Ø
 1060 FORN=1 TO 2Ø
 1070 IX+=XS
 1080 IY+=YS
 1090 WAIT
 1100 RECTANGLE FILL IX-XS,IY-YS,31Ø,32Ø
 TO IX,IY
 1110 NEXT
 1120 :
 1130 REM BREEDING (HEREDITY)
 1140 FORN=1 TO 9
 1150 FORG=1 TO 6
 1160 gene(G,N)=gene(G,gridp)
 1170 NEXT
 1180 NEXT
 1190 GOTO3ØØ
 1200 END
 1210 :
 1220 DEFFNR(A,B)
 1230 IF A>=B THEN SWAP A,B
 1240 =A+RND(1ØØØ*(B-A))/1ØØØ
 1250 :
 1260 DEFPROCL(X1,Y1,X2,Y2)
 1270 LINE X1,Y1,X2,Y2
 1280 string%-=SQR((Y2-Y1)^2+(X2-X1)^2)
 1290 ENDPROC
 1300 :
```

```
 1310 DEFPROCmutate
 1320 FORN=1 TO 9
 1330 IF N=5 THEN N=6
 1340 FORG=1 TO 6 STEP 2
 1350 gene(G,N)+=FNR(-mutate(G),mutate(G
))
 1360 gene(G+1,N)+=FNR(-mutate(G),mutate
(G))
 1370 IF gene(G,N)>extreme(G) THEN gene(
G,N)=extreme(G)
 1380 IF gene(G+1,N)<extreme(G+1) THEN g
ene(G+1,N)=extreme(G+1)
 1390 IF gene(G,N)<gene(G+1,N) THEN SWAP
 gene(G,N),gene(G+1,N)
 1400 NEXT
 1410 NEXT
 1420 ENDPROC
 1430 :
 1440 REM THE 2 DATA STATEMENTS CONTAIN
THE EXTREME VALUES OF
 1450 REM GENES 1-6 RESPECTIVELY, FOLLOW
ED BY THE RATES AT WHICH
 1460 REM EACH ONE MUTATES.
 1470 :
 1480 REM EXTREMES-
 1490 DATA 4,0.15,20,3,150,10
 1500 REM MUTATION RATES-
 1510 DATA 0.5,0.5,2,2,10,10
```

Listing 2 – Weba8

```
   10 REM Spiders web generator
   20 REM (Artifical selection)
   30 REM by Mathew Tizard
   40 REM for B/B+/M/C/E
   50 REM (C) BAU October 1992
   60 :
   70 MODE0:VDU23;8202;0;0;0;
   80 VDU19,1,6,0,0,0
   90 PRINT"Initialising..."
  100 DIM radius(150),angle(150)
  110 DIM gene(6,9),extreme(6),mutate(6)
  120 FORN=1TO6
  130 READ extreme(N)
  140 NEXT
  150 FORN=1TO6
  160 READ mutate(N)
  170 NEXT
  180 :
  190 REM INITIALLY RANDOM MENAGERIE
  200 FORN=1 TO 9
  210 FORG=1 TO 6 STEP 2
  220 gene(G,N)=FNR(extreme(G),extreme(G
+1))
  230 gene(G+1,N)=FNR(extreme(G),extreme
(G+1))
  240 NEXT
  250 NEXT
  260 :
  270 REM MAIN LOOP
  280 CLS
  290 prespos=0
  300 PROCmutate
  310 FORWY%=160 TO 1023 STEP 350
  320 FOREX%=160 TO 1280 STEP 450
  330 prespos=prespos+1
  340 OX=0
  350 OY=0
  360 MR=150
  370 VDU 29,EX%;WY%;
  380 GCOL0,1
  390 string%=7500
  400 increm=FNR(gene(1,prespos),gene(2,
prespos))
  410 angle=0
  420 R=0
  430 REPEAT R=R+1
  440 anginc=FNR(gene(3,prespos),gene(4,
prespos))
  450 angle=angle+anginc
  460 IF angle>360-(anginc/2) THEN angle
=360
  470 angle(R)=angle
  480 radius(R)=FNR(gene(5,prespos),gene
(6,prespos))
  490 TX=COSRAD(angle)*radius(R)
  500 TY=SINRAD(angle)*radius(R)
  510 PROCL(OX,OY,TX,TY)
  520 PROCL(0,0,TX,TY)
  530 IF angle=360 THEN PROCL(TX,TY,FX,F
Y)
  540 OX=TX
  550 OY=TY
  560 IF R=1 THEN FX=TX:FY=TY
  570 UNTIL angle=360
  580 MAXN=R
  590 OX=0
  600 OY=0
  610 N=0
  620 R=0
  630 REPEAT N=N+1
  640 R=R+increm
  650 IF N>MAXN THEN N=1
  660 X=COSRAD(angle(N))*R
  670 Y=SINRAD(angle(N))*R
  680 IF R>radius(N) THEN UNTILR>radius(
N):GOTO 730
  690 PROCL(OX,OY,X,Y)
  700 OX=X
  710 OY=Y
  720 UNTIL string%<0
  730 NEXTEX%,WY%
  740 :
  750 REM ARTIFICIAL SELECTION
  760 VDU29,0;0;
  770 NUM=0
  780 FORWY%=0 TO 1023-160 STEP 350
  790 FOREX%=0 TO 1280-160 STEP 450
  800 NUM=NUM+1
  810 VDU5
  820 MOVEEX%,WY%+24
  830 PRINTNUM
  840 VDU4
  850 NEXT
  860 NEXT
  870 REPEAT
  880 gridp=GET-48
  890 UNTIL gridp>0 AND gridp<10
  900 NUM=0
  910 FOR Y%=0 TO 1023-160 STEP 350
  920 FOR X%=0 TO 1280-160 STEP 450
  930 NUM=NUM+1
  940 IF NUM=gridp WY%=Y%+32:EX%=X%
  950 NEXT
  960 NEXT
  970 GCOL0,0
  980 PROCRECT(0,0,1280,WY%)
  990 PROCRECT(0,WY%+300,1280,1024)
 1000 PROCRECT(0,0,EX%,1024)
 1010 PROCRECT(EX%+300,0,1280,1024)
 1020 GCOL0,1
 1030 IX=EX%
 1040 IY=WY%
 1050 XS=(450-IX)/20
 1060 YS=(350-IY)/20
 1070 GCOL4,0
 1080 FORN=1 TO 20
 1090 PROCBOX(IX,IY)
 1100 *FX19
 1110 PROCBOX(IX,IY)
 1120 IX=IX+XS
 1130 IY=IY+YS
 1140 NEXT
 1150 CLS:PROCBOX(IX,IY)
 1160 :
 1170 REM BREEDING (HEREDITY)
 1180 FORN=1 TO 9
 1190 FORG=1 TO 6
 1200 gene(G,N)=gene(G,gridp)
 1210 NEXT
 1220 NEXT
 1230 GOTO290
 1240 END
 1250 :
 1260 DEFFNR(A,B)
 1270 IF A>=B THEN C=A:A=B:B=C
 1280 =A+RND(1000*(B-A))/1000
 1290 :
 1300 DEFPROCL(X1,Y1,X2,Y2)
 1310 MOVE X1,Y1
 1320 DRAW X2,Y2
 1330 string%=string%-SQR((Y2-Y1)^2+(X2-
X1)^2)
 1340 ENDPROC
 1350 :
 1360 DEFPROCmutate
 1370 FORN=1 TO 9
 1380 IF N=5 THEN N=6
 1390 FORG=1 TO 6 STEP 2
 1400 gene(G,N)=gene(G,N)+FNR(-mutate(G)
,mutate(G))
 1410 gene(G+1,N)=gene(G+1,N)+FNR(-mutat
e(G),mutate(G))
 1420 IF gene(G,N)>extreme(G) THEN gene(
G,N)=extreme(G)
 1430 IF gene(G+1,N)<extreme(G+1) THEN g
ene(G+1,N)=extreme(G+1)
 1440 IF gene(G,N)<gene(G+1,N) THEN C=ge
ne(G,N):gene(G,N)=gene(G+1,N):gene(G+1,N
)=C
 1450 NEXT
 1460 NEXT
 1470 ENDPROC
 1480 :
 1490 DEFPROCRECT(X1,Y1,X2,Y2)
 1500 MOVEX1,Y1
 1510 MOVEX1,Y1
 1520 MOVEX1,Y1
 1530 PLOT85,X1,Y1
 1540 PLOT85,X1,Y2
 1550 PLOT85,X2,Y2
 1560 MOVEX2,Y1
 1570 MOVEX2,Y1
 1580 MOVEX2,Y1
 1590 PLOT85,X2,Y1
 1600 PLOT85,X2,Y2
 1610 PLOT85,X1,Y1
 1620 ENDPROC
 1630 :
 1640 DEFPROCBOX(X,Y)
 1650 MOVEX,Y
 1660 DRAWX+300,Y
 1670 DRAWX+300,Y+300
 1680 DRAWX,Y+300
 1690 DRAWX,Y
 1700 ENDPROC
 1710 :
 1720 REM THE 2 DATA STATEMENTS CONTAIN
THE EXTREME VALUES OF
 1730 REM GENES 1-6 RESPECTIVELY, FOLLOW
ED BY THE RATES AT WHICH
 1740 REM EACH ONE MUTATES.
 1750 :
 1760 REM EXTREMES-
 1770 DATA 5,0.2,50,5,120,10
 1780 REM MUTATION RATES-
 1790 DATA 0.5,0.5,2,2,10,10
```

Listing 3 – Webn32

```
   10 REM Webn32
   20 REM Spiders web generator
   30 REM Natural selection
   40 REM (C) BAU Oct 92
   50 REM For 32-bit only
   60 :
   70 MODE 12:REM USE MODE 20 IF YOU HAV
E A MULTISYNC
   80 maxstring=9000
   90 OFF
  100 *FX9
  110 COLOUR7,6
  120 COLOUR15,1
  130 generations=0
  140 DIM FX(1000),FY(1000),ratio(9)
  150 DIM radius(200),angle(200)
  160 DIM gene(6,9),extreme(6),mutate(6)
  170 FORN=1TO6
  180 READ extreme(N)
  190 NEXT
  200 FORN=1TO6
  210 READ mutate(N)
  220 NEXT
  230 :
  240 REM INITIALLY RANDOM MENAGERIE
  250 FORN=1 TO 9
  260 FORG=1 TO 6 STEP 2
  270 gene(G,N)=FNR(extreme(G),extreme(G
+1))
  280 gene(G+1,N)=FNR(extreme(G),extreme
(G+1))
  290 NEXT
  300 NEXT
  310 :
  320 FOR flies=1 TO 1000
  330 FX(flies)=RND(300)-150
  340 FY(flies)=RND(300)-150
  350 NEXT
  360 REM MAIN LOOP
  370 prespos=0
  380 GCOL7
  390 VDU5
  400 MOVE500,692
  410 PRINT"Generation: ";generations
  420 VDU4
  430 OFF
  440 PROCmutate
  450 FORWY%=160 TO 1023 STEP 350
  460 FOREX%=160 TO 1280 STEP 450
  470 prespos+=1
  480 OX=0
  490 OY=0
  500 MR=150
  510 ORIGIN 0,0
  520 GCOL0
  530 IF prespos=5 THEN RECTANGLE FILL 4
60,360,300,300
  540 ORIGIN EX%,WY%
  550 GCOL7
  560 string%=maxstring
  570 increm=FNR(gene(1,prespos),gene(2,
prespos))
  580 angle=0
  590 R=0
  600 REPEAT R+=1
  610 anginc=FNR(gene(3,prespos),gene(4,
prespos))
  620 angle+=anginc
  630 IF angle>360-anginc/2 THEN angle=3
60
  640 angle(R)=angle
  650 radius(R)=FNR(gene(5,prespos),gene
(6,prespos))
  660 TX=COSRAD(angle)*radius(R)
  670 TY=SINRAD(angle)*radius(R)
  680 PROCL(OX,OY,TX,TY)
  690 PROCL(0,0,TX,TY)
  700 IF angle=360 THEN PROCL(TX,TY,FX,F
Y)
  710 OX=TX
  720 OY=TY
  730 IF R=1 THEN FX=TX:FY=TY
  740 UNTIL angle=360 OR sf%=1
  750 IF sf%=1 THEN GOTO920
  760 MAXN=R
  770 OX=0
  780 OY=0
  790 N=0
  800 R=0
  810 REPEAT N+=1
  820 R+=FNR(gene(1,prespos),gene(2,pres
pos))
  830 IF N>MAXN THEN N=1
  840 X=COSRAD(angle(N))*R
  850 Y=SINRAD(angle(N))*R
  860 IF R>radius(N) THEN UNTILR>radius(
N):GOTO930
  870 IF R>radius(N) THEN UNTILR>radius(
N):GOTO930
  880 PROCL(OX,OY,X,Y)
  890 OX=X
  900 OY=Y
  910 UNTIL sf%=1
  920 string%=0
  930 GCOL4,0
  940 T=0
  950 FOR flies=1 TO 1000
  960 IF POINT(FX(flies),FY(flies))=7 TH
EN T+=1
  970 NEXT
  980 FOR flies=1 TO 1000
  990 POINT FX(flies),FY(flies)
 1000 NEXT
 1010 ratio(prespos)=(10*T)-(maxstring-s
tring%)/8
 1020 GCOL2
 1030 VDU5
 1040 MOVE-150,150
 1050 PRINT ratio(prespos)
 1060 VDU4
 1070 OFF
 1080 NEXTEX%,WY%
 1090 win=5
 1100 FORtest=1 TO 9
 1110 IF ratio(test)>ratio(win) THEN win
=test
 1120 NEXT
 1130 generations+=1
 1140 gridp=win
 1150 ratio(5)=ratio(win)
 1160 XP=1+(win-1) MOD3
 1170 YP=1+(win-1) DIV3
 1180 ORIGIN 160+((XP-1)*450),160+((YP-1
)*350)
 1190 GCOL4,0
 1200 FOR flies=1 TO 1000
 1210 POINT FX(flies),FY(flies)
 1220 NEXT
 1230 ORIGIN 0,0
 1240 GCOL0
 1250 RECTANGLE FILL 0,0,1280,350*(YP-1)
 1260 RECTANGLE FILL 0,350*(YP-1)+286,12
80,1024
 1270 RECTANGLE FILL 0,0,450*(XP-1),1024
 1280 RECTANGLE FILL 450*(XP-1)+325,0,12
80,1024
 1290 GCOL4,0
 1300 :
 1310 IX=450*(XP-1)
 1320 IY=350*(YP-1)
 1330 XS=(450-IX)/20
 1340 YS=(350-IY)/20
 1350 FORN=1 TO 20
 1360 IX+=XS
 1370 IY+=YS
 1380 WAIT
 1390 RECTANGLE FILL IX-XS,IY-YS,310,320
 TO IX,IY
 1400 NEXT
 1410 FORN=1 TO 9
 1420 FORG=1 TO 6
 1430 gene(G,N)=gene(G,gridp)
 1440 NEXT
 1450 NEXT
 1460 GOTO370
 1470 END
 1480 :
 1490 DEFFNR(A,B)
 1500 IF A>=B THEN SWAP A,B
 1510 =A+RND(1000*(B-A))/1000
 1520 :
 1530 DEFPROCL(X1,Y1,X2,Y2)
 1540 LINE X1,Y1,X2,Y2
 1550 string%-=SQR((Y2-Y1)^2+(X2-X1)^2)
 1560 IFstring%<0 THEN sf%=1 ELSE sf%=0
 1570 ENDPROC
 1580 :
 1590 DEFPROCmutate
 1600 FORN=1 TO 9
 1610 IF N=5 THEN N=6
 1620 G=RND(3)*2-1
 1630 gene(G,N)+=FNM*mutate(G)
 1640 gene(G+1,N)+=FNM*mutate(G)
 1650 IF gene(G,N)>extreme(G) THEN gene(
G,N)=extreme(G)
 1660 IF gene(G+1,N)<extreme(G+1) THEN g
ene(G+1,N)=extreme(G+1)
 1670 IF gene(G,N)<gene(G+1,N) THEN SWAP
 gene(G,N),gene(G+1,N)
 1680 NEXT
 1690 ENDPROC
 1700 :
 1710 DEFFNM
 1720 H=RND(3)-2
 1730 IF H=0 THEN GOTO1720
 1740 =H
 1750 :
 1760 DATA 15,1.6,100,15,130,2
 1770 DATA 0.6,0.6,8,8,8,8
```

Listing 4 – WebN8

```
   10 REM Webn8
   20 REM Spiders web generator
   30 REM (Natural selection)
   40 REM by Mathew Tizard
   50 REM for B/B+/M/C/E
   60 REM (C) BAU October 1992
   70 :
   80 MODE0:VDU23;8202;0;0;0;
   90 VDU19,1,6,0,0,0
  100 PRINT"Initialising..."
  110 maxstring=8000
  120 generations=0
  130 DIM radius(140),angle(140),ratio(9
)
  140 DIM gene(6,9),extreme(6),mutate(6)
  150 FORN=1TO6
  160 READ extreme(N)
  170 NEXT
  180 FORN=1TO6
  190 READ mutate(N)
```

```
200 NEXT
210 :
220 REM INITIALLY RANDOM MENAGERIE
230 FORN=1 TO 9
240 FORG=1 TO 6 STEP 2
250 gene(G,N)=FNR(extreme(G),extreme(G
+1))
260 gene(G+1,N)=FNR(extreme(G),extreme
(G+1))
270 NEXT
280 NEXT
290 :
300 REM MAIN LOOP
310 CLS
320 prespos=0
330 VDU5
340 MOVE500,692
350 PRINT"Generation: ";generations
360 VDU4
370 PROCmutate
380 FORWY%=160 TO 1023 STEP 350
390 FOREX%=160 TO 1280 STEP 450
400 prespos=prespos+1
410 OX=0
420 OY=0
430 MR=150
440 VDU 29,EX%;WY%;
450 GCOL0,1
460 string%=maxstring
470 increm=FNR(gene(1,prespos),gene(2,
prespos))
480 angle=0
490 R=0
500 REPEAT R=R+1
510 anginc=FNR(gene(3,prespos),gene(4,
prespos))
520 angle=angle+anginc
530 IF angle>360-(anginc/2) THEN angle
=360
540 angle(R)=angle
550 radius(R)=FNR(gene(5,prespos),gene
(6,prespos))
560 TX=COSRAD(angle)*radius(R)
570 TY=SINRAD(angle)*radius(R)
580 PROCL(OX,OY,TX,TY)
590 PROCL(0,0,TX,TY)
600 IF angle=360 THEN PROCL(TX,TY,FX,F
Y)
610 OX=TX
620 OY=TY
630 IF R=1 THEN FX=TX:FY=TY
640 UNTIL angle=360
650 MAXN=R
660 OX=0
670 OY=0
680 N=0
690 R=0
700 REPEAT N=N+1
710 R=R+increm
720 IF N>MAXN THEN N=1
730 X=COSRAD(angle(N))*R
740 Y=SINRAD(angle(N))*R
750 IF R>radius(N) THEN UNTILR>radius(
N):GOTO 820
760 PROCL(OX,OY,X,Y)
770 OX=X
780 OY=Y
790 UNTIL string%<0
800 :
810 REM NATURAL SELECTION
820 T=0
830 FOR flies=1 TO 300
840 X=RND(300)-150
850 Y=RND(300)-150
860 IF POINT(X,Y)=1 THEN T=T+1
870 PLOT69,X,Y
880 NEXT flies
890 ratio(prespos)=(20*T)-(maxstring-s
tring%)/10
900 VDU5
910 MOVE-150,150
920 PRINT ratio(prespos)
930 VDU4
940 NEXTEX%,WY%
950 win=5
960 FOR test=1 TO 9
970 IF ratio(test)>ratio(win) THEN win
=test
980 NEXT
990 generations=generations+1
1000 gridp=win
1010 VDU 29,0;0;
1020 NUM=0
1030 FOR Y%=0 TO 1023-160 STEP 350
1040 FOR X%=0 TO 1280-160 STEP 450
1050 NUM=NUM+1
1060 IF NUM=gridp WY%=Y%+32:EX%=X%
1070 NEXT
1080 NEXT
1090 GCOL0,0
1100 PROCRECT(0,0,1280,WY%)
1110 PROCRECT(0,WY%+300,1280,1024)
1120 PROCRECT(0,0,EX%,1024)
1130 PROCRECT(EX%+300,0,1280,1024)
1140 GCOL0,1
1150 IX=EX%
1160 IY=WY%
1170 XS=(450-IX)/20
1180 YS=(350-IY)/20
1190 GCOL4,0
1200 FORN=1 TO 20
1210 PROCBOX(IX,IY)
1220 *FX19
1230 PROCBOX(IX,IY)
1240 IX=IX+XS
1250 IY=IY+YS
1260 NEXT
1270 CLS:PROCBOX(IX,IY)
1280 :
1290 REM BREEDING (HEREDITY)
1300 FORN=1 TO 9
1310 FORG=1 TO 6
1320 gene(G,N)=gene(G,gridp)
1330 NEXT
1340 NEXT
1350 GOTO320
1360 END
1370 :
1380 DEFFNR(A,B)
1390 IF A>=B THEN C=A:A=B:B=C
1400 =A+RND(1000*(B-A))/1000
1410 :
1420 DEFPROCL(X1,Y1,X2,Y2)
1430 MOVE X1,Y1
1440 DRAW X2,Y2
1450 string%=string%-SQR((Y2-Y1)^2+(X2-
X1)^2)
1460 ENDPROC
1470 :
1480 DEFPROCmutate
1490 FORN=1 TO 9
1500 IF N=5 THEN N=6
1510 G=RND(3)*2-1
1520 gene(G,N)=gene(G,N)+FNM*mutate(G)
1530 gene(G+1,N)=gene(G+1,N)+FNM*mutate
(G)
1540 IF gene(G,N)>extreme(G) THEN gene(
G,N)=extreme(G)
1550 IF gene(G+1,N)<extreme(G+1) THEN g
ene(G+1,N)=extreme(G+1)
1560 IF gene(G,N)<gene(G+1,N) THEN C=ge
ne(G,N):gene(G,N)=gene(G+1,N):gene(G+1,N
)=C
1570 NEXT
1580 ENDPROC
1590 :
1600 DEFPROCRECT(X1,Y1,X2,Y2)
1610 MOVEX1,Y1
1620 MOVEX1,Y1
1630 MOVEX1,Y1
1640 PLOT85,X1,Y1
1650 PLOT85,X1,Y2
1660 PLOT85,X2,Y2
1670 MOVEX2,Y1
1680 MOVEX2,Y1
1690 MOVEX2,Y1
1700 PLOT85,X2,Y1
1710 PLOT85,X2,Y2
1720 PLOT85,X1,Y1
1730 ENDPROC
1740 :
1750 DEFPROCBOX(X,Y)
1760 MOVEX,Y
1770 DRAWX+320,Y
1780 DRAWX+320,Y+314
1790 DRAWX,Y+314
1800 DRAWX,Y
1810 ENDPROC
1820 :
1830 DEFFNM
1840 H=RND(3)-2
1850 IF H=0 THEN GOTO1840
1860 =H
1870 :
1880 REM THE 2 DATA STATEMENTS CONTAIN
THE EXTREME VALUES OF
1890 REM GENES 1-6 RESPECTIVELY, FOLLOW
ED BY THE RATES AT WHICH
1900 REM EACH ONE MUTATES.
1910 DATA 15,1.6,100,15,140,2
1920 DATA 0.6,0.6,8,8,8,8
```

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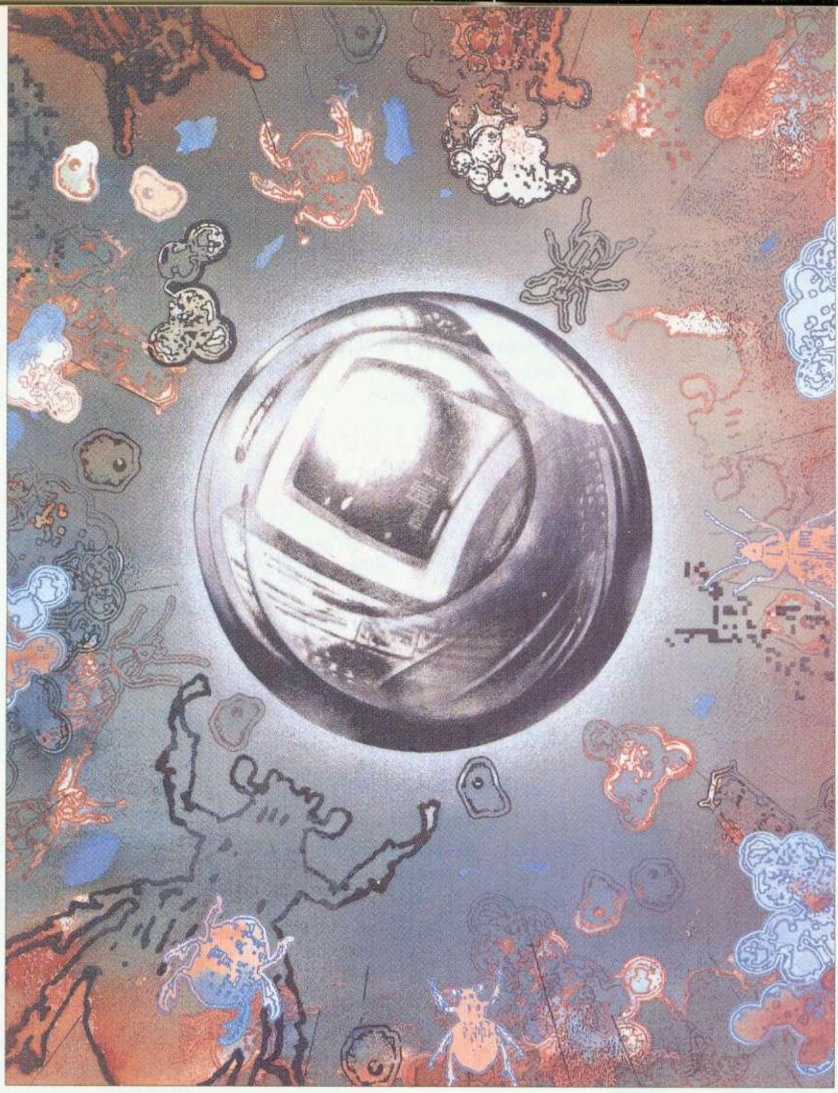
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GARY THOMPSON

There are a lot of myths around about viruses. But, as Alan Glover says, safe computing can be easy

DON'T PANIC

Over the past few months much has been written about viruses which has served to enhance the false impression that they are in some way mystical, magical entities able to defy all the laws of reason. As a result, several viral myths are circulating. They can be cured by taking a no-nonsense look at how viruses operate, and how they can spread.

WHERE ARE THEY FROM?

The first, and most common way, to contract a virus is by using an infected disc on your computer. In many cases, you do not need to actually run an infected program – just opening a directory viewer on an infected disc is enough. Infected discs can come from many sources, including PD libraries, friends and commercial software. Never make the mistake of assuming that something commercial is virus-free.

The second route in is over a network. This includes a machine used on an Econet or Ethernet network, where software is used which has been downloaded from a bulletin board system or information server of some description.

Thirdly, viruses can crop up on hardware upgrades – practically every expansion card has software on board as an Eprom. The code blown on the Eprom could have been infected with a virus. This has already happened once.

A virus cannot remain active in your computer when a CTRL-RESET is performed or the power is turned off. However it may well be reactivated very soon afterwards (in the case of an expansion card, almost instantly). You cannot catch a PC virus on the desktop; however, PC viruses work perfectly well under the Acorn PC Emulator. This is why viruses are mostly a problem for hard disc users – others merely have to hard-reset the system in between inserting floppy discs to avoid spreading the infection.

Once upon a time, removing a virus just involved deleting a couple of files and using *Edit* to alter a *!Boot* or *!Run* file. Some viruses now exist where RMKilling the module results in a machine crash 40 seconds later, and where part of the file the virus has merged itself with is kept in an encrypted form.

The only safe way to detect and remove a suspected viral infection is to use a piece of up-to-date virus removal software that understands all the known viruses presently circulating.

Using an old virus removal program is no good at all. It is possible it will damage files

HOW THEY CAN GET YOU

- **By adding extra files within an application, and amending the *Boot* or *Run* files to load the extra files.**
- **By merging their code with the *!Runimage* file of an application.**
- **By merging their code with library programs (for example, *Squeeze*).**
- **By merging their code with relocatable modules.**

because it is only aware of one strain of a virus which has several strains. It will not detect or remove newer viruses at all. It may cause the virus to spread further through your system, since this may be able to infect files as a result of the filing system calls made by the virus killer while searching the system.

If a virus is on a floppy disc, the first opportunity it will get to load onto a hard disc system will be when you open a directory viewer on the disc. To be safe, you should scan the disc using a virus detection tool *before* you open a directory viewer.

However, you may still be the unfortunate person who has followed all the advice above, but still seems to have a virus present. In this case it will be a new virus which is not yet understood by the virus detection tool you use. If you don't have a virus detection tool yet, go and buy one now!

Continued use of an infected hard-disc system is very dangerous. The virus will then be able to spread further, and a software 'timebomb' may detonate at some random point, causing damage to your files.

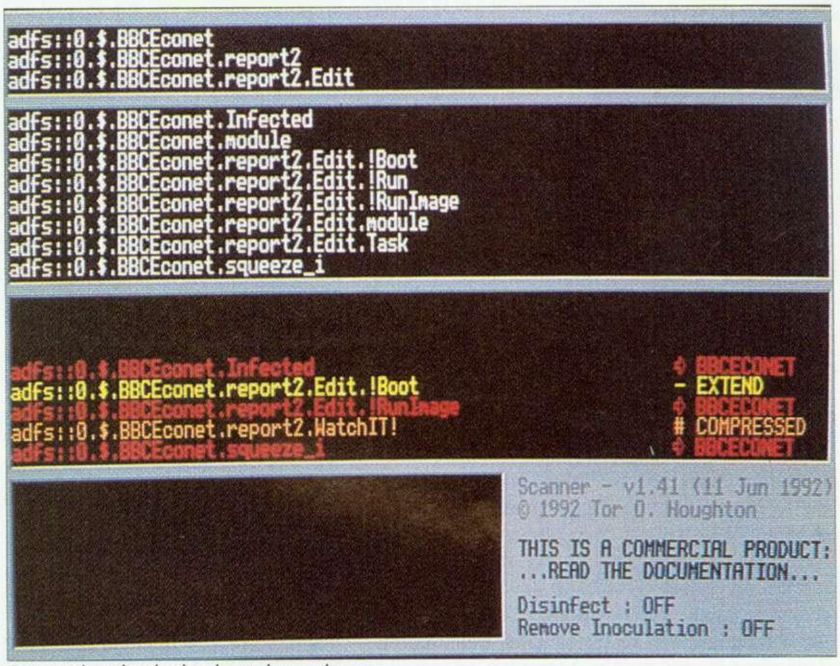
If you are a hard disc user, and you run into an unidentified virus, you should attempt to get an infected program or application on to a floppy disc, and then send it to the producer of the virus detection tool you used. Failing that, contact them and see if any other users have encountered the virus, You should not use your computer after that, until you have been notified that it is safe to do so. Of course, people with floppies only (provided you don't have infected expansion boards) need not worry – all you do is turn the machine on and off, which kills any virus in Ram, and avoid using infected floppies.

Before you attempt to analyse a virus yourself, notify others. Vital time can be lost while you take several days to do a task which could be done faster by someone more experienced. In the worst case, it may make the difference between being able to update the whole world about a virus before a software timebomb zaps them all.

THE BAD GUYS

The list below represents a few of the more prolific viruses. A complete description of all viruses known as the AVRD (Acorn Virus Reference Document) can be obtained from certain bulletin boards such as Arcade. It is also supplied with good virus killing software.

● BBCECONET: This is very similar to Link, but spreads by using a trojan version of the BBCEconet module 0.09 which it installs (this is the RISC OS 2 Rom version). See also Mode87. It infects &FF8 files, appending its code and redirecting the entry point of the code through itself. The virus code is encrypted with a varying key. It also directly attempts to infect %.squeeze, and disables Tor Houghton's *Interferon* during infections. It displays a message on Friday 13th, 25 December, 1 April and 25 June. Part of the infected file is also encrypted. Quick Check: press F12 then enter help bbceconet. If the module version number is 0.09, proceed to the second stage. If it is other than 0.09, you are not infected. Type modules and look for BBCEconet.



Scanner is unleashed to hunt down viruses

A WORD TO THE WISE

● Inoculating programs don't work. These are pieces of software that put a non-malignant bit of data on a file that looks like a virus to another virus, so the latter will not infect your system because it thinks it's already there. At best, this will only protect against one virus, and that protection will generally be rendered useless if a different virus infects the file.

● Using a virus detector or remover is not enough. It must be less than six months old to be of any use, and should come from an accredited and accountable source. A virus detector or remover is the ideal place for a new virus to be hidden – be suspicious of any new anti-virus tools (especially PD programs where the author of the program is unaccountable, and there is no guarantee the program has not been tampered with).

Newly received software can be tested on a different machine not connected to any network.

● Keep regular backups in case a virus corrupts a disc.

● Keep floppy discs write-protected. Always keep original discs write-protected unless the instructions tell you not to.

● Use software which can detect viruses, and check any disc you receive BEFORE you even bring up a directory viewer on the disc.

● Use a program like *VProtect* (part of the Pineapple Software suite) which will prevent almost all known viruses from infecting a clean machine.

If the first seven digit number begins 018 or 019 you are infected (see also Mode87).

● CEBIT: Aside from infecting applications (via the *Boot* file as usual) it will stop proceedings on every 16th infection to display a message from 'Devil, The Lord of Darkness'. This virus was discovered in Germany, and is not thought to have spread to the UK yet. Quick Check : press F12, then enter help tlodmod. A message of the form 'Module is . . .' shows that it is loaded.

● EXTEND: This lives in applications, using one of eight possible names. It modifies or creates a *Boot* file to load itself. Apart from claiming more and more memory (eventually causing the system to run out) it is harmless, but very contagious. Quick Check : Press F12 and type 'help extend' – a message of the form 'Module is . . .' indicates that it's loaded.

● GARFIELD_W: This infects *Boot* files and loads a module called *WimpAIDS*. The module is stored within a directory called *Obey* inside the infected application. It will cause continuous errors on the first monday of the month, making the system almost unusable. Quick Check : Press F12 and type help wimpaids – then a message of the general form 'Module is . . .' indicates that it's loaded.

● ICON (ALSO KNOWN AS FILER): There are a number of variants of this around – seven have been encountered already. All use !Boot files to propagate. One variant does nothing but spread itself. The others generate a nonsensical error message when they are first loaded. Quick Check : a file called *Icon*, *Poison*, *Splodge* or *NewVirus*(!) inside an application which is filetyped as a sprite, but is actually Basic.

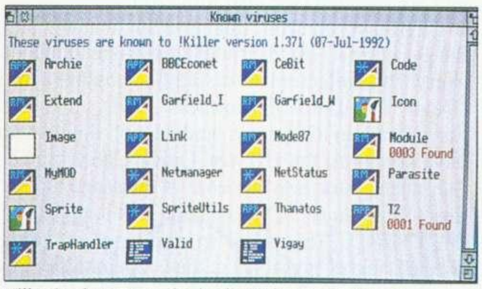
● IMAGE: This is basically a *!Boot* infector, but with a couple of variations. A *!Boot* file is created if one did not exist, otherwise it renames *!Run* to *!Spr*, and saves a *!Run* of it's own. It loads into OS workspace at address &5500, so the chances of it being overwritten and causing a crash are quite high. Quick Check: A file called *Image* appearing in application – length 512 bytes, and no filetype.

● LINK: This is effectively a trojan – a module called *BStoDel* which does indeed convert ASCII code 8 to ASCII code 127. It also infects &FF8 files, appending its code and redirecting the entry point of the code through itself. The virus code is encrypted with a varying key, making it harder to spot casually. It also directly attempts to infect '%.squeeze', and disables Tor Houghton's *Interferon* during infections. It displays a message on Friday 13th. Quick Check: press F12 then 'help bstodel'. A message of the form 'Module is . . .' shows it is loaded.

● MODE87: This virus overwrites or creates *!Boot* files, sand saves itself as a module called *Mode87*. The module installs itself as BBCEconet, which may affect Econet networks using software which relies on this module. On every 256th infection a graphic effect is displayed.

Quick Check: As for BBCEconet, plus a file called *Mode87* in application directories.

● MODULE: This is quite different, and works by appending it's code to any modules loaded whilst an infected module is active. It then redirects some of the module entry points to itself (and then on to the original entry points). This virus is very common, and has appeared on a number of distribution discs. Quick Check: Any modules with changed timestamps, and



Killer is always on the lookout for new viruses

have grown by almost 1K are potential suspects. Loading the module into *Edit* will reveal the Ascii string 'Press any key to continue' near the end of the file.

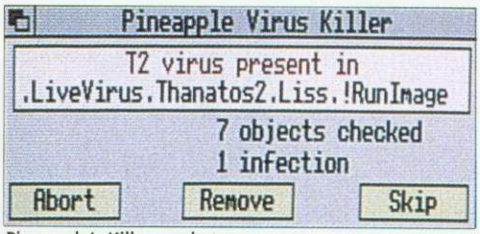
● NETMANAGER/TRAPHANDLER: This is a variation of the *!Boot* theme, with the whole virus being in the *!Boot* file. Quick Check : press F12 then 'help netmanager' or 'help traphandler'. A message of the form 'Module is . . .' shows that it is loaded.

● PARASITE: This virus is another module based virus, but should be treated with great care. The module is loaded from *!Boot* or *!Run* files. Two strains of this virus are known already – the first is a module called *FontLibrary*, the second can go by one of twenty names! The virus only acts on machines where the station number is configured to be less than 80.

Do not RMKill the visur module – you will activate a 40-second time bomb which will crash the machine. Like RISCOSExt this virus has a variety of different tricks which occur at different times, some potentially destructive, so great care should be taken in deaking with it. It will also delete any files or directories called !vkiller, vir, shield, prot or !guardian. Quick Check: *Show Alias$Run<Return – if nothing is displayed, the virus is not active.

● SPRITE: This is another *!Boot*/!Run infector, with a related 720-byte code file called *Sprite* (filetyped as a Sprite). During February, it has a delayed action bomb which will display the message: Piracy IS theft -Your SYSTEM is DOOMED – Deutschland Uber Alles! and zero all the CMOS Ram. Quick Check: A 720-byte Spritefile in an application, and maybe a file called *!Str* (which used to be the *!Run* file)

● SPRITEUTILS: This virus has been written to pass undetected by earlier versions of *!Killer*. It infects *!Run* files, and installs a trojan *SpriteUtils* module, which has the filename



Pineapple's Killer ready to pounce

SprUtils. There is no directly malicious code, but there will be a reduction in the amount of memory available in the system. Quick Check: Press F12 and type help screencopy and RETURN. The message No help found indicates that the virus is *not* present.

● THANATOS (ALSO KNOWN AS RISCOSEXT): This is one of the worst of the viruses discussed here. It does various nasty things on particular dates, with a random chance of something happening at any time. Any outbreaks of this virus should be treated rapidly to avoid any chance of data loss. Quick Check : Look in the Task Manager display for 'Thanatos'.

● T2: This is probably the worst of the viruses discussed here. It spreads by merging itself with !Runimage files of filetype &FF8. On certain days it will corrupt discs in ADFS::0 – ADFS::7. There is also a random chance of this happening at any time. Quick Check: Enter BASIC, and enter SYS "OS_ServiceCall" &C0FFEE TO ,A:PRINT A. If a zero is printed, the virus is present (or something else is impersonating the virus to stop it loading)

STAY COOL, BECAUSE . . .

- You cannot catch a virus by simply using a Bulletin Board. A virus is a program, and it can only spread when it is run.
- You cannot catch a virus from a printer or other intelligent peripheral.
- A virus cannot exist in the Cmos configuration memory of a computer.
- You cannot catch a virus from a blank disc. Unlike DOS discs, there is no executable code on an empty formatted disc.

BE CAUTIOUS WHEN. . .

- Spurious or nonsensical errors occur when opening directory viewers
- Spurious errors occur when running applications
- New files appear
- Datestamps change on files
- Unusual error messages or inexplicable system crashes happen
- Strange messages are displayed
- You find less memory is available than usual

STAY SAFE

- Scan *any* new disc with a virus killer (and get one if you haven't got one!)
- Always have a program like *VProtect* resident
- Don't rely on someone who says they have checked a disc for viruses. Check it yourself. It's your data that's at risk!
- Keep regular backups. Cycle the discs/tapes used for the backups.
- Check out anything suspicious with the technical support service for the virus killer you are using

JUST WATCH IT, OK?

- It is illegal to spread viruses, or to cause damage to someone's data under the Computer Misuse Act.
- The Acorn world is far smaller than that of the PC, and there are correspondingly fewer software authors. It will also be that much easier to identify virus authors.
- The spread of viruses could severely affect the PD Libraries and BBSs available to you.
- One example already exists of the 'benefits' of writing a virus. A computer technician added his name and address to a virus and distributed it 'to see how far it would get'. What it got him was the sack from his job.

THE GOOD GUYS

● SCANNER: Primarily a detector rather than a remover. Available from Tor Houghton, Fjellveien 4, PO Box 142, 1361 Billingstad, NORWAY. This is commercial software and 'costs' three floppy discs. Site and distribution licences by arrangement.

● KILLER/VPROTECT, by Pineapple Software (originally distributed by Acorn) Part of the Pineapple Software Virus Protection Scheme, an annual subscription scheme which ensures that users get at least four updates per year with the capacity to perform an immediate update when a dangerous virus comes to light. *Killer* detects and removes all known viruses. Cost: £24 excluding VAT, area licences available. Pineapple Software, 39 Brownlea Gardens, Seven Kings, Ilford, Essex, 1G3 9NL. Tel: 081-599 1476. Technical Support: PO Box 459, Cambridge, CB1 4QB or Fax: (0223) 415222.

With both these packages you receive a copy of the Archimedes Virus Reference Document, which provides detailed explanations of all the known viruses and their behaviour together with information about the virus removal tools available.

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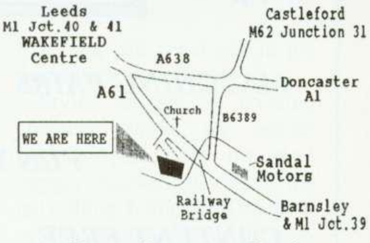
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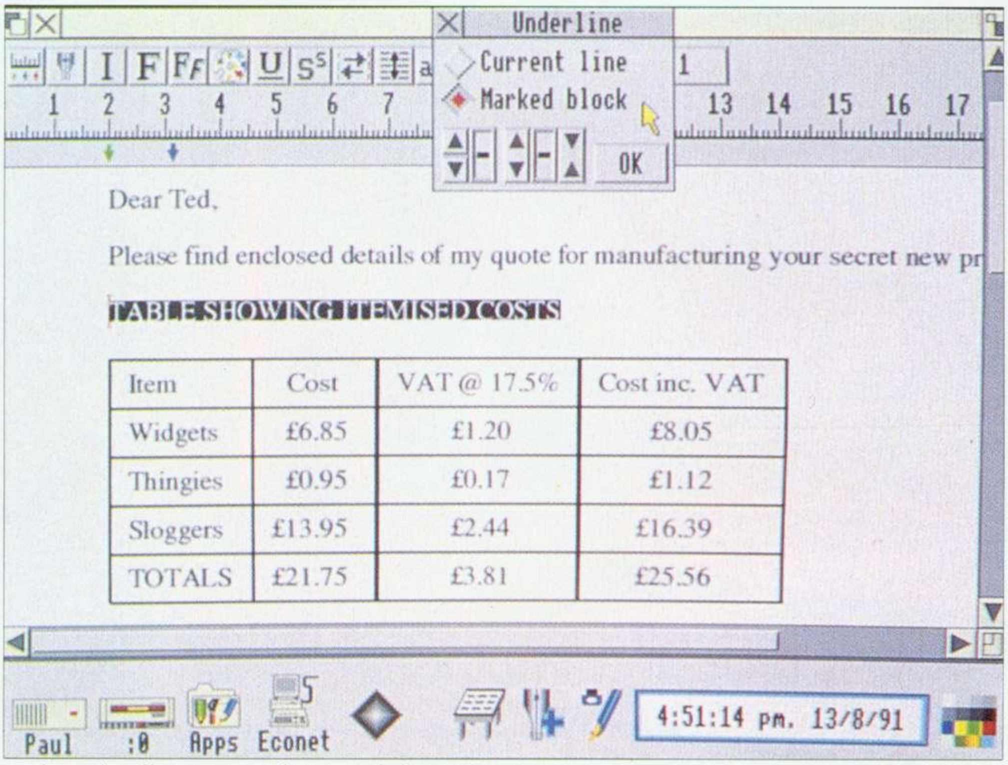
FAMILY FAVOURITE

Lisa Hughes wonders if Pendown Plus can equal the record of its popular cousins

Family values aren't what they used to be – ask David Mellor – but families themselves are still in fashion. Ambridge has the Archers, Albert Square has the Fowlers, we all have the Windsors and Longman Logotron has the *Pendowns*, a family of word processors and, guess what, they're all related.

The newest member of the clan is Archimedes *Pendown Plus*, which is proudly presented as a 'complete writing environment'. This is how I'd describe a well-appointed cottage on a Cornish clifftop with no telephone but a pub down the road. That aside, the package *is* a sophisticated tool for manipulating text.

The *Pendown* products are all educational word processors and, while retaining the accessible features of *Pendown*, *Pendown Plus* has a number of enhancements and additional features.



Pendown Plus offers many new features including a table editor

The two major ones are a table editor and an address database management system. The idea is that the more advanced features will appeal to those with a couple of years experience in word processing: older students and teachers are obvious candidates. School secretaries may well find these functions invaluable, though I would question just how many schools do their administation on an Arc.

But you don't have to be in education to use *Pendown Plus* and, in many ways, it would actually be more suitable for someone involved in running a small business. The table editor is rather useful. There's no messing about with tabs or resorting to pencil and ruler to draw in the lines. Text and numerals are entered via a dialogue box and you can add rows and columns at will. A table can be saved as a comma separated values file or a *Draw* file, which can then be dropped into your document.

Entering and editing data in the address list manager is straightforward and you can choose which field to sort on. It's easy to run off labels from the files, though it's irritating that you can't change the size of the lettering, as the program makes this decision automatically, based on information from the printer driver about the size of your stationery.

The mail merge function is another matter. In most offices, anyone who can mail merge is regarded with considerable reverence. Sadly I didn't elicit this response from my colleagues because I couldn't get it to work at first. The theory seems simple enough: you set up a datafile containing the information you want inserted and a document with coded areas to indicate where you want it to go, then you execute a merge. The instructions appear clear and, in fact, once I used the example files, I managed to send the same letter to Oliver Cromwell and Francis Drake without too much trouble.

As a more-than-basic word-processor, you can hardly fault *Pendown Plus*. It gives you insert or overwrite options; a whole variety of actions, from underline to superscript, are a cinch; changing fonts is easy; and there's a clever way of using wildcards to alter, say, all occurences of eight-point Trinity Bold to ten-point Trinity Medium. Also, if you can't remember what a font like Homerton or Selwyn looks like, you can try it out in the font selector window.

Styles are set by creating chapters based on master pages. Apart from the mail merge, this was just about the only thing I found difficult to get the hang of – a stronger visual reminder that you are working on a master page, not a document, would be helpful.

Excellent though it is, *Pendown Plus* will not appeal to everyone. It's worldly, it's adult and is a definite step into the serious side of word processing. But my favourite family was always the Brady Bunch and they were never quite so appealing once they started growing up.

FRENCH CONNECTION

Due out in October is another *Pendown* family member, this time a French cousin.Based on *Pendown Plus*, *Pendown Etoiles* is entirely configured in French and offers the expected word processing functions, plus keyboard access to French accents and a substantial French dictionary.

PRODUCT DETAILS

Product: Pendown Plus
Supplier: Longman Logotron, 124 Cambridge Science Park, Cambridge, CB4 4ZS
Tel: (0223) 425558
Price: £92.83 inc VAT

LaserDirect

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All conventional laser printers, such as PostScript, require powerful processors and large amounts of memory. In effect they are duplicating your computer inside the printer.

By making the Archimedes do the work, LaserDirect can use a simple engine-only printer so this duplication is removed with considerable cost savings. The result is better value for money.

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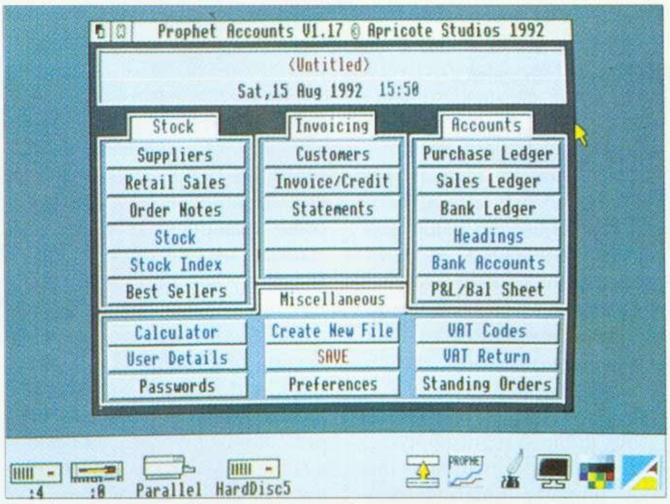
Clem Vogler audits the latest in integrated accounting systems for the Arc

Accounting packages for the Arc are proliferating. The latest, *Prophet,* is a single-user book-keeping package, although a networking version is in the offing. *Prophet* keeps track of your sales, purchases and bank transactions by maintaining three files or 'ledgers' – the purchase, sales and bank ledgers. It can also handle invoicing and stock control. It maintains databases of customers, suppliers and stock items. The ledgers and databases are related so that changes in one area are reflected elsewhere, if appropriate. So, if you issue an invoice, this will not only be recorded in the sales ledger, but also cause the stock record to be updated.

If you don't want to use all the facilities, you can equally well select just the parts of *Prophet* you need. For example, you might not want to run the stock control section, or you might just stick to cash sales without issuing invoices.

Accounts software is never easy to get up and running because you need to enter a lot of data to reflect the existing state of the business. Once installed, you need to set up your customer and supplier databases and your stock database if you wish to use one. You must enter your bank accounts – which includes such things as credit cards and cash in hand – with their opening balances. You must construct a database of what *Prophet* calls 'headings'. These are cost centres appropriate to your business, so that every item of income, expense, capital or liability can be assigned a code. Typical examples include motoring costs, rental of premises, bank interest and staff wages. Deciding which cost centres to use is the most difficult part of setting up the system and may require the advice of an accountant. It is, however, a problem which applies to any book-keeping method, whether computerised or manual.

With your system set up, the day to day running of *Prophet* is commendably easy. Whenever you make a purchase you enter it in the purchase ledger, using three pre-determined codes to indicate the cost centre to which the purchase is assigned, the bank or cash account from which it is paid and the rate of VAT. When you make a sale you do the same in the sales ledger. With sales you can instead issue an invoice or enter an invoice-less retail sale in the daybook. Both methods then update the stock control database and sales ledger simultaneously, with daybook updates being batch processed to one cost centre at the end of the day. Whenever you make payments to a bank or transfers between accounts, you enter these in the bank ledger.



Prophet covers a good range of accounting procedures

DOUBLE ENTRY BOOK-KEEPING

Traditional manual systems of book-keeping use a double entry system. Every credit in a ledger is balanced by a compensating debit elsewhere. If you enter a purchase in your purchase ledger, then you make a corresponding debit in a so-called nominal ledger, where transactions are grouped in categories called cost codes. With manual book-keeping the double entries provide a means of error trapping. If the two ledgers don't balance there must be an error.

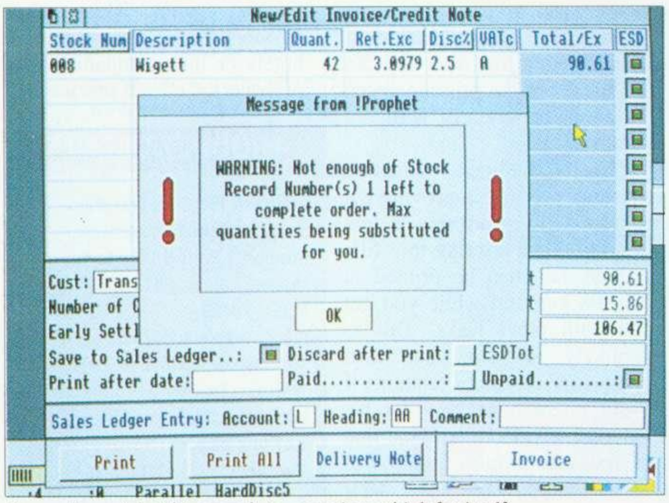
Computerised book-keeping removes the need for making two physical entries. Provided you mark each transaction with its cost code, the nominal ledger can be updated by the system. *Prophet* has been described as a single entry system without a nominal ledger, but this is over simplified. It is single entry in so far as the user only enters transactions in one ledger. The system still makes a compensating entry in the Headings file, which is where the cost codes are defined.

For an accounts package to be any use, it has to provide some essential facilities. *Prophet* meets these minimum requirements. It can:

- List all transactions in an audit trail.
- Print credit notes and handle credits.
- Produce an aged debtors' report showing who owes what for how long.
- Print customer statements.
- Issue an automatic re-order when stock levels drop below minimum.
- Permit journal entries for making corrections.
- Produce a three-monthly VAT report.
- Account for repetitive transactions, like standing orders.

The latest version of *Prophet* will also produce a profit and loss statement and a balance sheet. It is sometimes held that the production of these is an accountant's task, not a book-keeper's. However, most book-keeping software offers this nowadays, and it can provide an outline for the accountant to work from.

I liked *Prophet*. It was robust and never crashed, and I thought the user interface was well set out, making the program easy to use. There were several nice features, but also some weaknesses.



The package is bright enough to sometimes think for itself

On the credit side were the clear, uncluttered form designs with displayed function key options. Details from each ledger can be printed as a report in which it is easy to select certain fields and ignore others. Reports can be transferred as Ascii or CSV files to other packages such as *Edit*, *Pipedream* or *Impression*.

Invoices, credit notes, purchase orders and delivery notes come as standard templates, whose design is easily adjusted as all field positions can be mouse dragged. If you use window envelopes, as I do, you can adjust the name and address to appear properly centred in the window.

There are several features to cut down on repetitive data entry. As you would expect, entering a product or VAT code in a ledger or invoice results in the system supplying such further information as the code supports. Entering truncated customer or supplier names implements a search to find the nearest match. There is, however, no option to locate customers or suppliers by code. *Prophet* does have a Copy From option which allows you to replicate an existing record which you then edit if the new record only needs minor changes.

Earlier versions of *Prophet* had mouse drags implemented so you could move the contents of one field to another. On current versions, only the calculator output field contents can be dragged. Instead there is a utility called *Transfer*.

Transfer is a cut and paste utility which comes free with *Prophet* or which may be bought separately. It installs itself on the icon bar and lets you copy text from any icon in any Risc OS application and transfer it elsewhere. The beauty of *Transfer* is its easiness: Click the right hand button on the source fields to capture them. Click the left hand button on the target location to paste them. And that's it . . . It should be on every icon bar.

The stock control module is comprehensive. It takes account of discounts, bin locations, VAT rates, markups, re-order levels and re-order quantities. It produces statistics on best-selling items. If you try and post an invoice for more items than are in stock it will warn you. On my version of *Prophet* (1.17), the stock sort was not yet implemented, but is said to be present on current versions and available as a no cost update to users of earlier versions.

I disliked the inconvenient ledger windows. The window is too wide to display in normal width modes like mode 12 or mode 20. When first called up, only as much of the window as would be visible in normal width mode is displayed. If you are using a wide desktop like mode 16 or mode 102, you have to open up the window to see the full ledger, even though you had plenty of space available at the outset. The window cannot be scaled. Another irritation is that the number of ledger rows displayed is fixed at five.

There is no vertical scroll bar or arrow and so you can't scroll with the mouse, only with the arrow keys. Also, the column widths are not adjustable, so what you see is sometimes truncated.

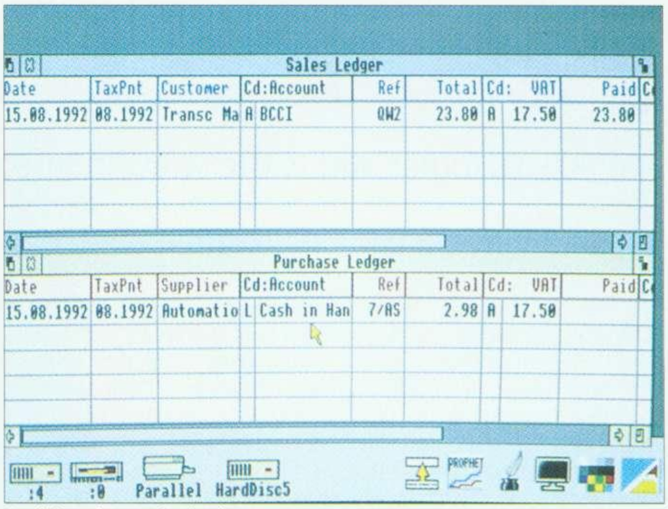
There are insufficient options to display report output on screen instead of printing it. Ledger reports and customer/supplier lists can be exported to *Edit* or some other application and then displayed, but the customer accounts cannot. Frequently, you need these details on screen, but you don't need a printout.

Printing uses the Risc OS printer drivers and all printing is done in graphics mode rather than in text mode. This means that the full range of fonts in your font directory can be used, but the printing speed is slow, particularly with dot matrix printers.

The handbook suggests various ways of improving the speed – either printing at low resolution or printing to a file, which can then be printed in the background while you get on with other tasks. This is unlikely to win your firm prizes for customer relations if your client is waiting for his invoice. Apricote tells me that a fast text printing mode will be incorporated in later versions.

I rate *Prophet* as a competent book-keeping package for a small business. The serious opposition comes from *Micro Trader* from PRES. *Micro Trader* is more refined – its screen displays are object lessons in good design and its use of memory more economical. It also offer features not present on *Prophet*, like a mailing module, and is available in a network version. It is also more expensive.

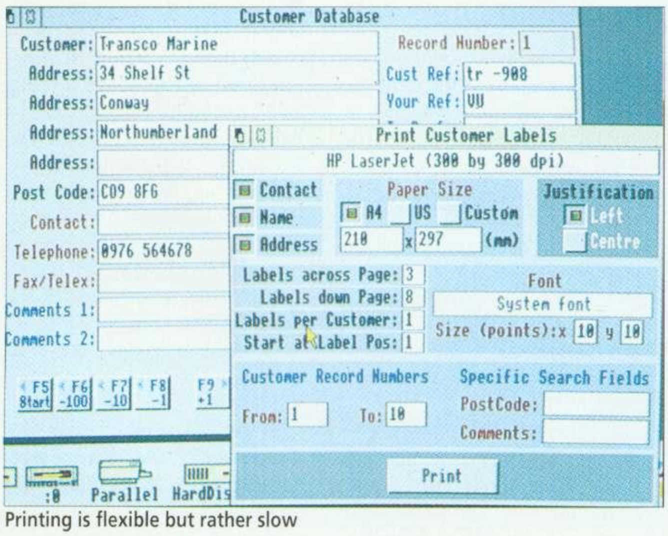
Prophet can automate standing orders and other periodic transactions which *Micro Trader* cannot. This makes *Prophet* attractive to users like hotels or hire companies who offer period costed services.



Book-keeping made simple

HARDWARE REQUIREMENTS

Prophet is written in interpreted Basic with some routines in assembler for speed, though it is not particularly fast. All files are held in memory. Memory management is a bit crude – you have to run a preferences option and insert your estimates of the number of customers, stock items and so on. It would be better if the program grabbed data space as it needed it. You can, however, increase your estimates whenever you need to. The program itself occupies about 1Mb, and there is a trade off between the further memory requirements for stock, supplier and customer data. As a rough guide, if you had 5,000 stock items and 100 customers/suppliers, or 500 stock items and 1,000 customers/suppliers, you would use a further 600K.



Printing is flexible but rather slow

PRODUCT DETAILS

Products: Prophet, Transfer
Supplier: Apricote, Apricote Studios, 2 Purls Bridge Farm, Manea, Cambs, PE15 0ND Tel: (0354) 78432
Prices: Prophet: £170.00 + VAT.
Site Licence: £510.00 + VAT.
Transfer: Free with Prophet. If bought separately: £8.95 incl of VAT and p&p.
Machines: All 32-bit machines, with 2Mb of Ram minimum.

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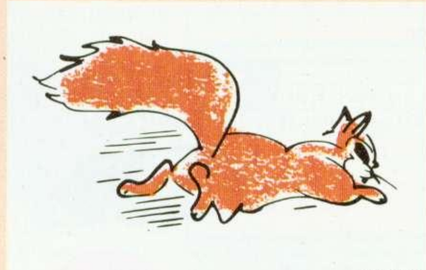


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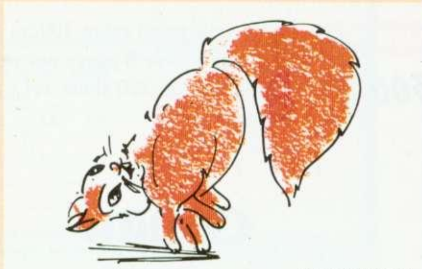
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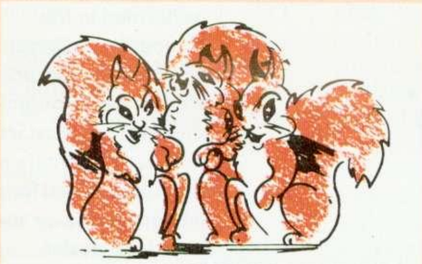
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AZTEC CAMERA

Lost civilisations can live again in the classroom. Chris Drage looks at Landmarks

The problem of providing suitable vicarious experiences for primary school classes is not new. Where books, filmstrips and visits to the local museum have often been the mainstays of the past, the problem of developing empathy and a sympathetic understanding of the people being studied often remains.

In the BBC *Landmarks* series children are presented with both the factual background material and a range of images, but it is through the *Landmarks* software that upper Key Stage 2 children are are given the opportunity to develop a deeper understanding of and a feeling for a given period in history and to experience it 'first hand'.

In *Landmarks: Columbus*, the simulation takes place over two real-time days synchronised with the Arc's time clock (one on board ship, and one after landing in the 'Indies') In *Aztecs* the simulation encompasses three full days during which the host, a 10-year old girl, can be guided around her home and Tenochtitlan, the city in which she lives.

Even if the computer is switched off for a period of time, if the *Landmarks* disc is reinserted, each simulation continues as if that amount of time had elapsed. To add to the realism, certain events only happen at certain times on specific days. When the simulation is completed, it returns to 'day one'.

'Conversations' with each historical 'host' take place using the keyboard – the mouse is largely redundant. Questions typed in appear in red while the host's responses are highlighted in blue.

Children quickly become aware of the computer's inability to understand many of their queries and the frequency with which it makes inappropriate responses. This limitation is not such a handicap as it first appears and can be turned to advantage when considered in the light of technology AT5, where children should become aware of the limitations of technology!

Landmarks also sharpens children's questioning techniques. When a scene changes, a monochrome, digitised image of the new screen appears in an adjacent window. This adds to the children's interest and assists their imaginations.

There are two well-presented A4 handbooks accompanying each package: the teacher's guide contains all program information, including all the objects and events to be discovered and it has a generous-sized section that cross-references various areas of the National Curriculum. The pupils' guide contains ten additional activities which they may or may not use in conjunction with individual *Landmark* programs.

The degree of success to be obtained from this software will be determined as much as anything by the amount of preparation put in by the teacher beforehand. Setting the scene, discussing the possible outcomes and whetting the pupils' collective appetite are vital elements in any computer simulation, in order to establish children's expectations at a realistic level.

LINKING IT UP

Although primarily biased towards history, simulations like those of the *Landmarks* series are cross-curricular by their very nature and possess a vast potential for all manner of related work.

In addition, many skills are practised through direct use of the programs: discussion skills, skills of questioning and instructing, observation skills and spatial skills (understanding compass directions and so on). Both *Landmarks – Aztecs* and *Landmarks – Columbus* are geared towards History Study Unit 6: Exploration and Encounters 1450-1550, which specifically states that the Aztec civilisation should form part of the study.

Landmarks – Aztecs should enable children at the top of Key Stage 2 to gain an understanding of the Aztec way of life; gods and religion, crafts and daily life. Similarly, the *Columbus* simulation helps children to gain insights into the reasons for the voyage, the motivations of Columbus himself and the life of the sailors on board.

With the right input, these latest programs in the *Landmarks* series will prove a valuable history resource.

LANDMARKS IN THE NATIONAL CURRICULUM

Landmarks addresses the following History attainment targets:

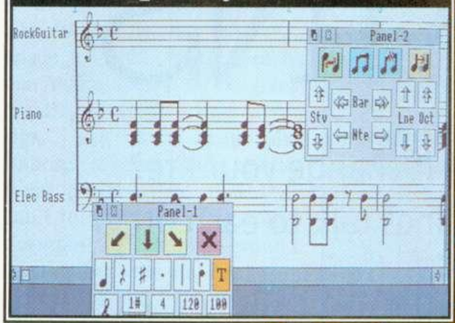
- **TARGET 1: KNOWLEDGE & UNDERSTANDING OF HISTORY**
  - Level 2: Suggest reasons why people in the past acted as they did.
  - Level 2: Identify differences between past & present times.
  - Level 4: describe the different features of an historical period.
- **TARGET 2: INTERPRETATIONS OF HISTORY**
  - Level 2: Show an awareness that different stories about the past can give different versions of what happened.
  - Level 4: Show an understanding of how deficiencies in evidence may lead to different interpretation of the past.
- **TARGET 3: THE USE OF HISTORICAL SOURCES**
  - Level 2: Recognise that historical sources can stimulate and help answer questions about the past.
  - Level 3: Make deductions from historical sources.
  - Level 4: Put together information from different historical sources
- In addition English ATs relating to speaking, listening, writing and reading will all be addressed.

PRODUCT DETAILS

Products: Landmarks – Columbus and Landmarks – Aztecs
Supplier: Longman-Logotron, 124 Cambridge Science Park, Milton Road, Cambridge, CB4 4AZ Tel: (0223) 425558
Machine: Archimedes series.
Price: £24.00 ex VAT each

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Rhapsody II £61.95

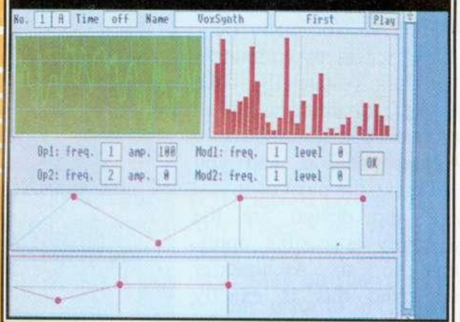


Clares bring you a range of music software that is fast becoming the standard on the Archimedes.

Rhapsody II is a music notation package that allows you to write and modify musical scores. It is to music what a word processor is to words.

The notes can be entered by hand or, using a Midi keyboard, they can be captured in real time or step time. Once the music has been captured you can edit it, transcribe it, add lyrics, repeats, trills, slurs etc. You can transpose the score or just parts of it, you can play it back through Midi, you can even use it as an unpaid accompanist to your practice sessions. Most importantly you can print your finished score using any printer and RISC OS printer drivers. Quite simply, Rhapsody II lets you get back to the music AND gives you time to enjoy it. Many users wonder how they ever managed without it! Ask us for a demonstration version today.

Vox Box £61.95



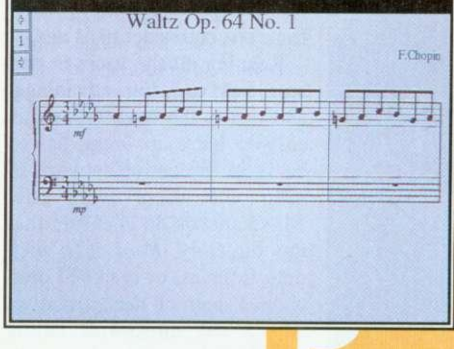
Vox Box is a supporting package for Rhapsody II and consists of four programs. The first, *Perform,* allows you to play Rhapsody II scores, Armadeus samples and Midi files. You can have a continuous performance of your compositions.

VoxBeat is an application to turn sampled percussion sounds into a useful voice module that provides realistic percussion accompaniment to your scores.

VoxSample converts sound samples into usable Archimedes voices. You control which part of the sample is used to create the voice and you can also define the sound's envelope. The resulting voice module is much smaller than the original sample and sounds much better.

VoxSynth is a more complex application that enables you to digitally synthesise voices for use in the Archimedes. Voices are produced by drawing waveforms or harmonics. You even have a form of FM synthesis available. *VoxSynth* is also useful in the science laboratory as it deals with waveforms, harmonics, FFT and FM synthesis.

ScoreDraw £61.95



ScoreDraw is another support program for Rhapsody II. It produces high quality printout of music scores. Together *Rhapsody II* and *ScoreDraw* form the heart of a complete Archimedes based music publishing package. *ScoreDraw* takes a score from *Rhapsody II,* or the original *Rhapsody,* and converts it into a series of Draw files. The results are of true professional publishing quality – especially when printed on a laser printer.

ScoreDraw has its own library of music symbols and it uses these to construct a high quality score. Any text within the score is converted into user selectable outline fonts, if they are available. An additional user library is also supplied which provides items such as hairpins and grace notes.

In addition to improved print quality *ScoreDraw* also concentrates more on the formatting of the score. Because the score is handled differently and *ScoreDraw* is not required to 'play' the score it can spend more time on good presentation.

And there's more... Look out for two more music packages coming from the Clares stable soon. And don't forget our Armadeus Sound sampling board if what you are interested in is recording and manipulating sound rather than music.

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CLARES

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NET GAINS

What can you do with a network, and how will it change your life? Paul James explains the benefits of making machines talk to each other

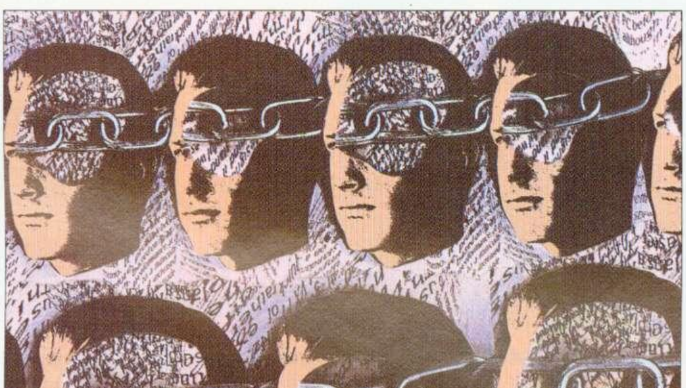
Once you have a computer, there are numerous opportunities to make money. Not many people have access to computers and printers, (especially those of the Arc's quality) and if you have, then you're in quite a privileged position, and you should make the most of it.

DTP and design are the most easily accessible applications to an Archimedes owner. And this is exactly where the money can be made. A person with an Arc can do everything that a professional typesetting bureau can and it can do it more cheaply and offer that personal touch.

Just think how many small events go on in your local village or town. Church fetes, car boot sales, flower shows and all of them need signs and posters. People without computers will always need people with computers too, for CVs, letters and perhaps school projects.

Irene, Anna, Meg and Paul have between them an A5000, an old 310, two Master 128s and one BBC Model B. Occasionally Irene gets small jobs from her local school and DTPs them using *Impression*, and Anna and Meg produce leaflets for local events, Anna uses *Draw* on her A310, and Meg uses *Wordwise+*. Paul uses his computer to type in CVs and letters for his friends using *View*.

Of course, merging together as one unit means that they are going to be far more viable as a co-operative business. They can support each other and, perhaps, use their contacts to increase their client base,



DARREL REES

meaning they can do more work for more people. Merging the computers together as a network will improve their organisation as well as save money, as I will explain.

The first benefit of a network is organisation, but other benefits appear as the gang begins to explore the possibilities. Econet is cheap, and suits their needs, so Irene buys Acorn's Level 4 software, cabling, a clock box and an Econet card for each machine.

Irene's machine is going to be used as the fileserver, meaning it will be running the Level 4 software. Using the software, Irene can create users. A user will be able to log onto Irene's fileserver, and use her hard disc as if it were their own. This means that there is no need for the two Masters to use floppy discs on a regular basis, saving time and the worry of a floppy becoming corrupt.

Using the Level 4 software, Irene can restrict each created user in several ways that will improve the efficiency of the network, and therefore their work. First, and most importantly, Irene can specify exactly which part of her hard disc each user sees. This contains Paul, Anna and Meg within one area, which can again be subdivided into further areas for each user. The figure opposite shows how Irene structures her hard disc.

Keeping all the users in one area has one big advantage, and that is the network area is easy to back up. Irene has to back up the entire network to keep other users' work safe. All she needs do is ensure that the directory *Root* is copied onto floppies, or archived onto another part of her hard disc. All of the directories below *Root* will be archived as well, so all the users are safe in the knowledge that they'll not lose all of their hard work in the case of a minor hard disc crash on Irene's machine. Obviously if Irene's hard disc completely crashes, or somebody steals her computer then it's all gone, and that's down to backup, which is another story.

Irene creates these areas on the disc, then creates three users, Anna, Paul and Meg, using the *Manager,* supplied

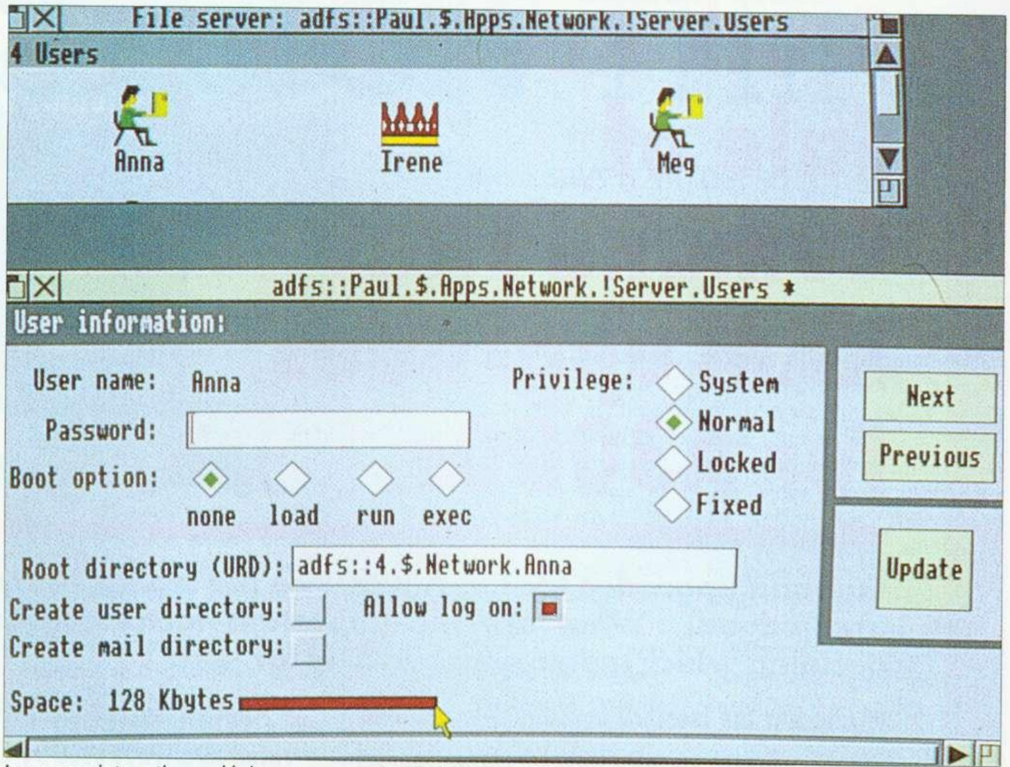
with Level 4. She sets the URD (User Root Directory) of each user so that when Paul, Anna or Meg log on they are just presented with their area.

Now when Paul logs on from his Master, by typing *I AM PAUL, he has his own space to work in. In here he can make merry as he likes, creating directories and saving files. But Irene can also impose several other restrictions on Paul, so that Paul can't turn her hard disc into a disorganised dumping ground, wasting her time and his.

First of all, she uses the space allocation option to only allow Paul 128K of her disc space. This means that the user Paul can only save 128K of data onto Irene's hard disc. If he overflows this then he will be told that Irene's disc is full (even though it may not be).

If Paul ever fills up his area of Irene's hard disc he will have to tidy up, by removing old files. If Paul seems to be very disorganised about how much old work he leaves in his area, then Irene can tighten up his space allocation, meaning that Paul will have to tidy up more often, getting him into a regular habit. Making sure that there are very few unused files on the network will mean that backing up will be quicker too.

Obviously, each user has different requirements for space and it may take a couple of weeks before Irene has Paul's space allocation about right: big enough so that he doesn't have to tidy up every day, wasting time, and small enough that his work doesn't become sprawling and unorganised, again wasting time.



Irene goes into action and brings new users into being

Anna is the exception. She uses an Archimedes to create pictures, maps and illustrations for joint work, so she'll need a little more space, as the files created by an Archimedes are generally bigger than plain text files, so Irene gives her 256K.

Irene can also limit the sorts of things Paul, Meg or Irene can do on her hard disc. There are four types of users, system, normal, locked and fixed. A system user would have access to all of Irene's hard disc, and could read, write and delete files from it. On a larger network, Irene would give herself system privileges so that she could have access to software on her machine over the whole network, and access to everybody's area. A normal user has access to all files with Public Read and Write Access.

A normal user can make a file protected so that nobody else, except a system user, can access or delete it. A normal user can go up past their own URD so, for instance, Paul could go into Meg's area, but he would only have access to files that Meg had marked as public read or write. Any files without this access would be locked away from Paul's eyes, or itchy delete finger.

In the ideal situation, Meg would say to Paul, 'would you have a look at this file in my area', and then she would give it public read and write access while Paul looked at it. After Paul had finished with it, she would return it to its normal status by taking the public read and write options off it.

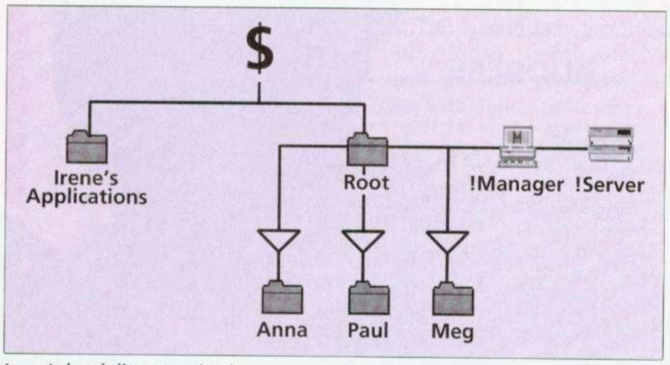
A locked user is only a little less restricted; they can't change their password and have to ask a system user to do this, and they can't change their boot option. A fixed user is the lowest privileged of the four types, and they can't move out of their own directory. They also have to ask a system user to change their password and boot option.

The boot option determines what happens when a user logs on. It is possible to automatically execute a program on log on using a *!Boot* file – this might be a menu program, for instance. As you can see, the best use for a locked or fixed user is as a central resource that everybody uses, like a games directory or an information directory where manuals and other data could be kept.

Irene makes her three users normal users, and now the network can function. Paul and Meg can use their BBC Master 128s for typing, Anna can use her machine for doing diagrams and illustrations, and Irene can use hers for DTP.

When they work on a joint project, all the data is saved onto Irene's machine, where she brings it together as the finished document but, in the mean time, if Paul wants to write an application letter for a friend, he can use his machine as if it had his own disc drive and printer, and the same goes for Anna and Meg.

Next month we'll explain network printing and the future of Acorn networks.



Irene's hard disc organisation

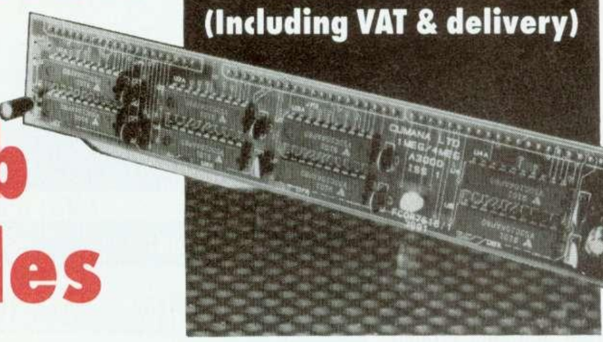
NETWORK NUMBERS

On a network, each machine has an individual number, which is set using a special utility on the library disc. The network number is important, as each machine on the network needs to be told the network number of the machine running the server software, otherwise the user would have to type it in all of the time. They are also used for notifying other machines, and by this month's network *Chat* utility in ∗INFO.

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THE VISION THING

A colour digitiser for less than £100? Geoff Bains says it's true, so it must be

Just how cheap can a digitiser be? When HCCS's monochrome Vision was tested (*BAU* June 1992), £50 for a monochrome video digitiser seemed pretty good value. But now HCCS has introduced the colour version for just £80.

This uses the same hardware as the monochrome model. If you own a mono Vision, the software upgrade costs only £47 (unless yours is an early version which included a voucher for the upgrade for just £29).

This is a half-width podule with a single socket on the back plate – the video input. Into this you can plug any composite video source, from a video recorder, camcorder, satellite receiver or some TVs.

The new software operates much like the old, with one or two additions. Everything you need is in one application, *Cvision*, which produces a window on to the video source.

This displays a poor quality mono digitised image, updated in 'continuous mode' once a second. This is too slow when you're trying to capture that single-frame perfect moment so it's essential to have an alternative display showing the video in realtime.

Unfortunately, all the mouse actions on the whole screen are also slowed to this sluggish once-a-second response rate, which makes using the Desktop rather tedious. HCCS is currently working on speeding things up.

Pressing the Menu button produces (eventually) a list of options. These primarily enable a video frame to be grabbed and processed to full resolution and colour.

The actual grabbed video data is stored in 1Mb of Ram on the podule. This is accessed to produce the image on screen. The Vision board grabs the video signal 'raw' and extracts the wanted data with digital processing. Most digitisers use analogue methods to convert the signal and then digitise the end result. The HCCS method is more difficult but keeps costs down.

The video data is processed to produce a mono image of 720–254 resolution and 256 greyscales in about 11 seconds, in the same way as the old software. The image can also be processed to give a colour sprite at the same resolution and in 256 colours. HCCS is planning an upgrade to enable 720×508 images to be captured.

Cvision will grab and process images in any of modes 12, 15, 20, 21, 27 or 28. Modes 15, 21 and 28 must be used for colour processing.

The image can be processed to colour in two ways. The first is rough but fast, and takes 1.5 minutes. The second gives a finer image but takes about 7 minutes. Each colour image is built up line by line on the screen.

The fast colour processing is for experimenting with. The same grabbed video frame can be processed and reprocessed as often as you want using any of the three methods. Between processing, brightness, contrast and colour saturation can be changed with mouse-alterable scales in a sub-menu.

In fact, in the middle of colour processing a picture, while it is being built up line by line on the screen, the controls can be altered, the effect judged, further corrections made, and so on until the picture is being formed as desired. Then the process is started all over again to deliver a perfect picture. This is just as well, since the quality of the final image is very much dependent on the settings used. The video source itself must be suitable too. Any source that allows some altering of brightness, contrast and so on helps to provide a better image on which *Cvision* can operate.

When the video source and settings are right, as in our example, the quality of the image is excellent – it is hard to see just what other digitisers costing two or three times the price really have to offer. It's true they can provide a faster, real-time sampling of the image but it's the final output that really counts.

The last item on the menu is to save the image. All grabbed images are saved as standard sprites along with their pallettes. It was here that the only problem arose. Saving a grabbed sprite to a full disk crashed out the whole *Cvision* program crashed out, losing the carefully grabbed frame. However, HCCS promises that this too is being worked on, and free upgrades will be available when the problem is cracked.

It's difficult to fault this unit. It isn't perfect - the grabbing lag takes some getting used to - but the bottom line is that the Colour Vision gives quality colour images at a price that's hard to argue with And once they are successfully saved, grabbed images can be used in a vast number of applications.



PRODUCT DETAILS

Product: Colour Vision
Supplier: HCCS, 575-583 Durham Road, Engine Lane, Low Fell, Gateshead, Tyne and Wear NE9 5JJ Tel: 091-487 0760
Machines: All Archimedes, BBC A3000
Price: £79 (£92 for A3000 external podule)

TECHNOMATIC

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TECHNOMATIC

techno-I COLOUR VIDEO DIGITISER

techno-I is the leading colour video digitiser for the Archimedes, with features usually found only on the top-of-the-range models for the IBM PC.

techno-I is a very versatile real-time RISC-OS based video digitiser; it can grab pictures from any video source (TV, Video recorder, etc.) and convert them into sprites. The digitised sprites can then be used in RISC-OS applications such as art or DTP packages.

Unlike simpler video digitisers, techno-I separates colour and luminance data while digitising, *techno*-I handles images in 25 bits, with 7bits luminance and 18bits chrominance (it encodes images in UVL colour space, which mimics the human visual system). This allows you to manipulate the captured images by hue, saturation or luminance; the colours are therefore truly WYSIWYG. *techno*-I will also give true monochrome representation of colour images.

The incoming video is displayed in real time in a viewfinder; the viewfinder display can be monochrome or colour. The viewfinder can be 1/16 or 1/4 screen area, you are able to drag the viewfinder around the screen.

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All viewing, video and digitising parameters are software controlled; there are no presets, no setting up, simple connect to a video signal, load the software and digitise!

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- Contrast, colour and brightness set from desktop.
- Image scaling up to 1280 by 1024 in any 256 colour mode.
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Trevor Attewell, Archimedes World

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Steve Bruntlett, The Micro User

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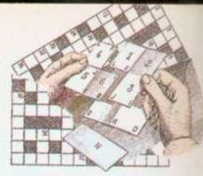
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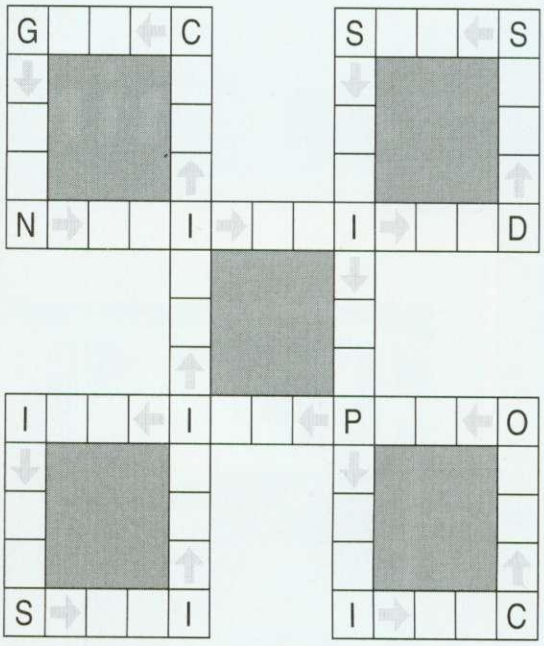
Look at the grid on the right. It consists of five interlocking 'rings'. Around each ring in the direction indicated by the arrows can be written four overlapping seven-letter words. You must find these words and complete the grid. As a guide we have given you the middle letters of each word. Every word starts on an arrowed square.

To find the seven-letter words solve the five sets of clues below. Each set corresponds to one ring. The sets are not in any particular order, but the clues in each set are in exactly the same order as their solutions appear in the appropriate ring. Therefore, if you find the answer to one clue, the last three letters will form the first three of the solution to the next clue and so on.

Clues:

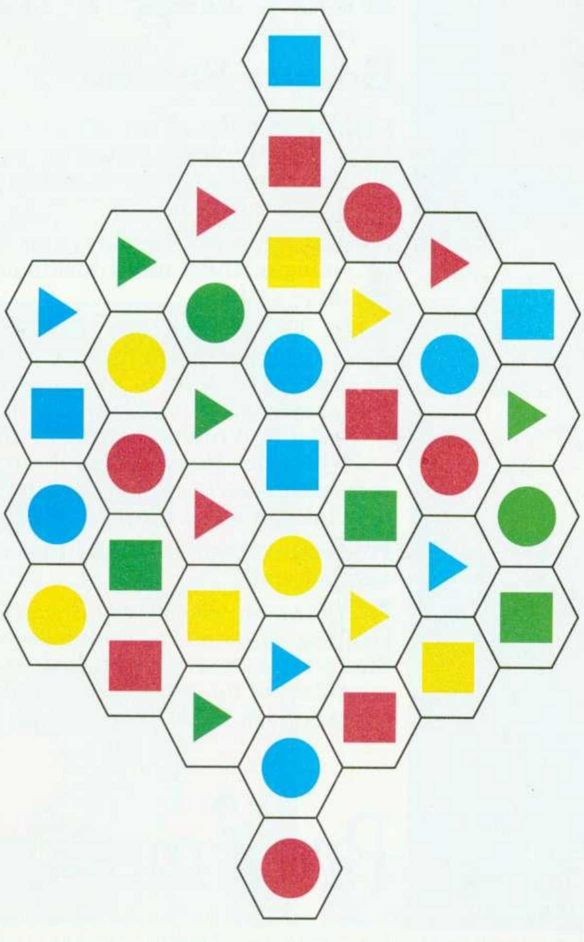
1. Replica (anagram); Muddle; Vocabulary; Tapering
2. Relation; Dummy; Family; Indian
3. Chloride, bromide etc; High-pitched; Opposite; Sprite-like
4. Fall; Checkmate?; Corrector; Knocks
5. Charged; Church seats; Negotiates; Meeting

When you have solved the puzzle, send your entry to *BBC Acorn User*, 101 Bayham Street, London Nw1 0AG to reach us byOctober 1 1992. Please mark your envelope October Puzzle. Photocopies of your solution are acceptable. The solution will be published in the November issue and the winner will be announced in the December issue.



SHAPE UP!

Below is a maze – a special maze. Beginning with the blue square at the top your task is to trace a path to the red circle at the bottom. You can move to any adjacent hexagon containing a symbol of the same shape or colour.



RECURRING NIGHTMARE

There are some 11-letter words that begin and end with the same three letters. Without cheating (and using your computer-based dictionary!) can you think of 11-letter words which start and finish with these: cal, ent, mic and und?

NUMBER PATH

Starting with the eight (top-left), trace a path through the grid keeping a running total as you go. You may move left, right, up or down (not diagonally).

Can you find a path to the four (bottom-right) for which the sum is correct? No square may be visited twice and all intermediate results are positive integers.

8	+	4	+	2
-	9	-	6	/
9	/	3	/	5
-	3	+	5	=
7	/	8	=	4

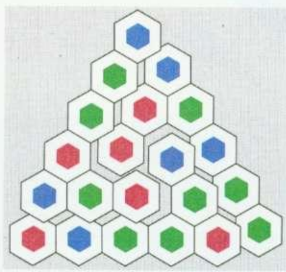
SOLUTIONS

June: The winner of June's prize crossword is Mr J M Bastable of Portsmouth.

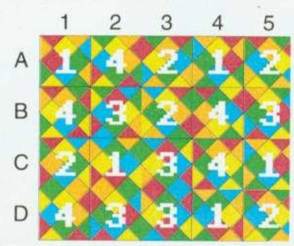
July: The solution to Word Sums was Scots and Kilts. The winner will be announced next month.

August: Changing colours: blue flue flux flax flan clan cyan. Other solutions are possible.

Hex-tricate: Solution shown



Few-tile: The mosaic was made up of just four different tile designs (shown).



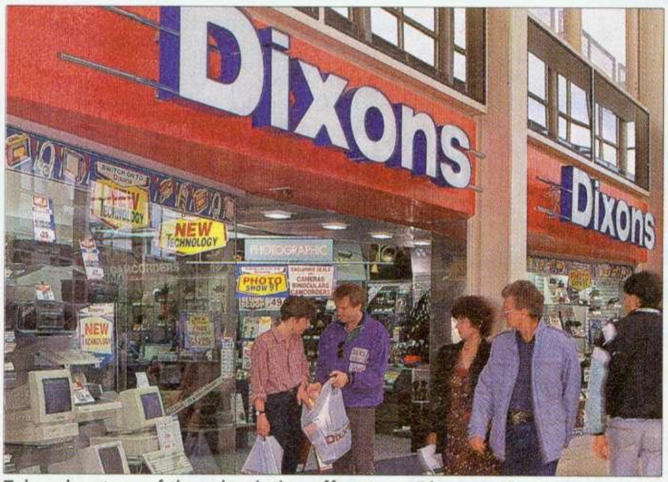
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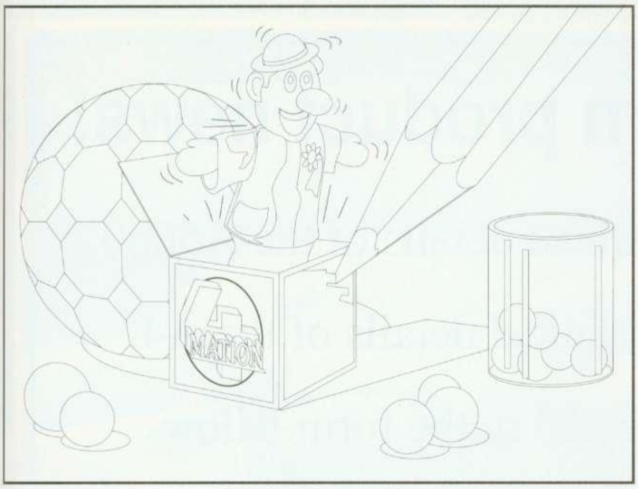
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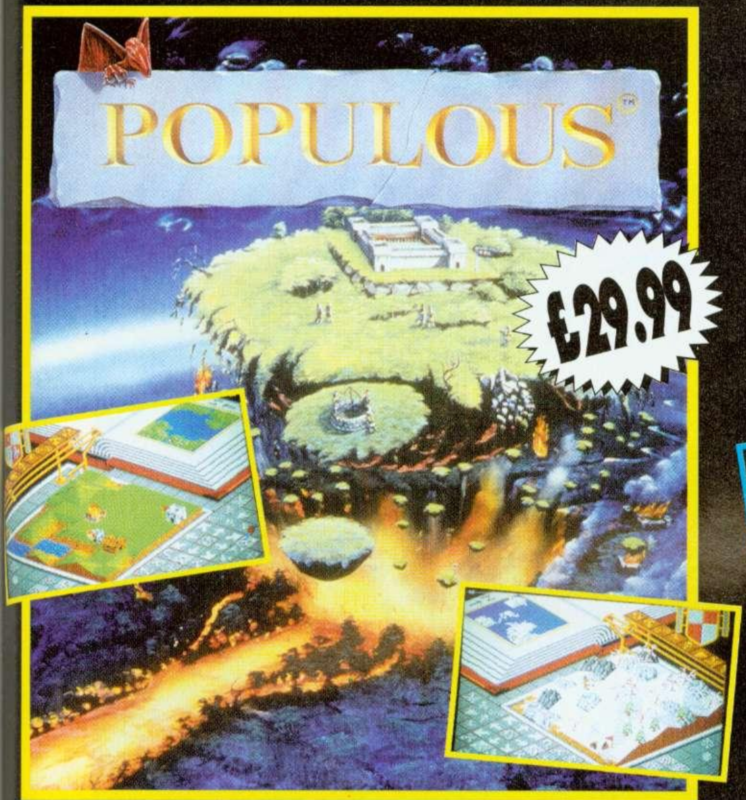
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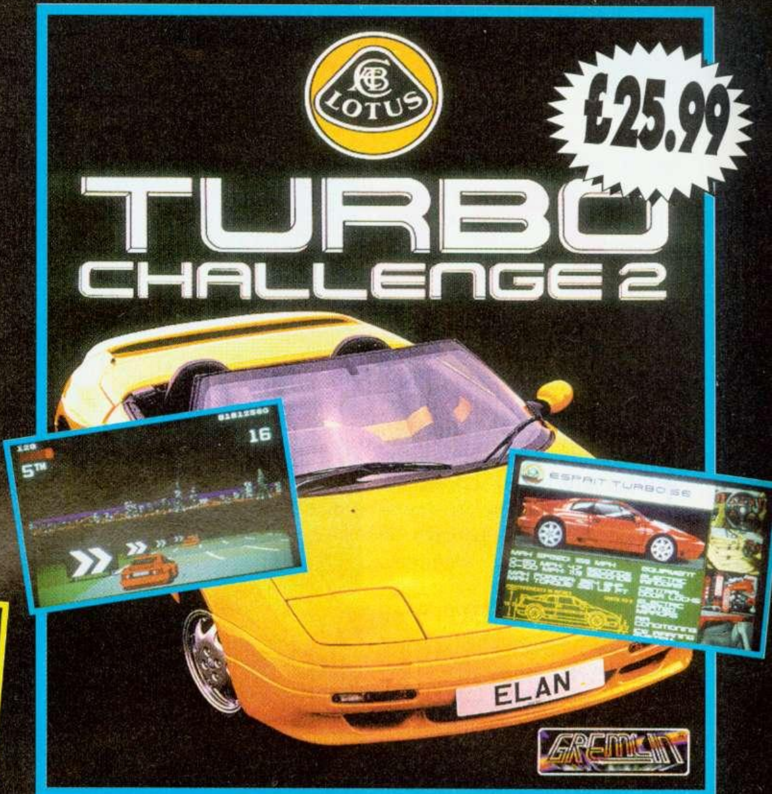
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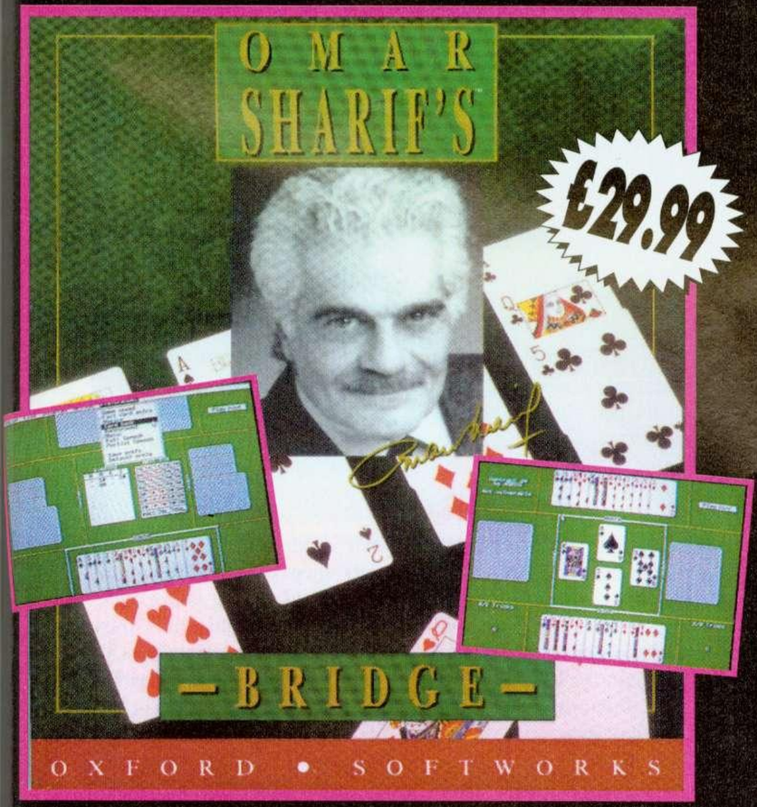


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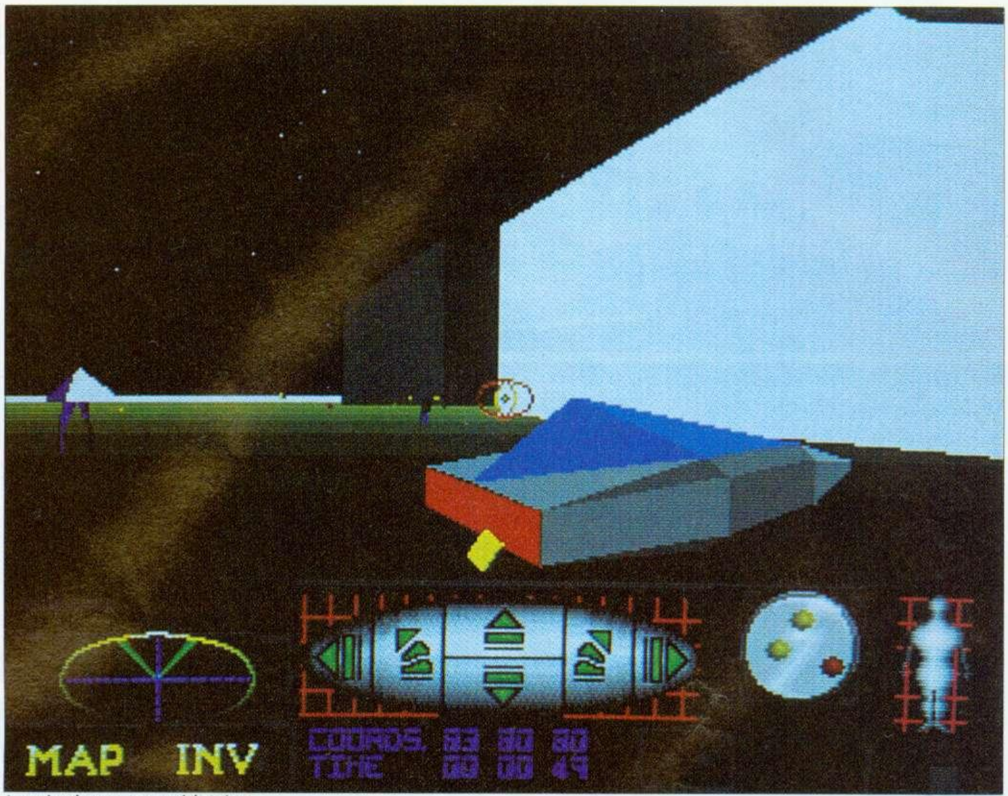
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GAME SHOW

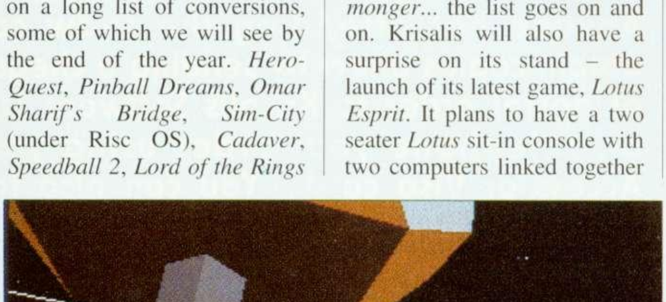
It's nearly Show time, and there will be no shortage of excellent games to spend your well-saved pennies on when you get to Wembley. Things have gone into overdrive this year, with a flood of top-notch releases finally coming our way.

The Fourth Dimension reckons it will have both *Nevryon 2 – Technodream* and *Black Angel* ready for the show. It has several other projects in the pipeline too. *Dungeon* is still at an early stage but is a role-playing game that will involve walking around in 3D dungeons, made up of sprites mapped onto the walls, which gives a strong feeling of depth and solidity. There is also the amusingly titled *Galactic Dan* on the way, described as a '3D action arcade adventure' featuring ray-traced graphics.



Lost in threespace with Ixion

The real heroes of Archimedes games at the moment have to be the team at Krisalis who, as if they hadn't done enough already, are working on a long list of conversions, some of which we will see by the end of the year. *Hero-Quest*, *Pinball Dreams*, *Omar Sharif's Bridge*, *Sim-City* (under Risc OS), *Cadaver*, *Speedball 2*, *Lord of the Rings 1 & 2*, *Battle Chess*, *Powermonger*... the list goes on and on. Krisalis will also have a surprise on its stand – the launch of its latest game, *Lotus Esprit*. It plans to have a two seater *Lotus* sit-in console with two computers linked together allowing visitors to race against each other. Just like the real thing. I can't wait.



Black Angel – do these ships look familiar?

More good news – two new games software houses have just emerged. The first, Image Systems, has already started acquiring the publishing rights for games like *Jeeves and Wooster* and *Sensible Soccer* (widely acclaimed as the best football game out of shorts), and has plans for more. After *Mr Doo*, it will shortly release a game provisionally entitled *Globdule* which its says will provide some serious competition for *Lemmings*.

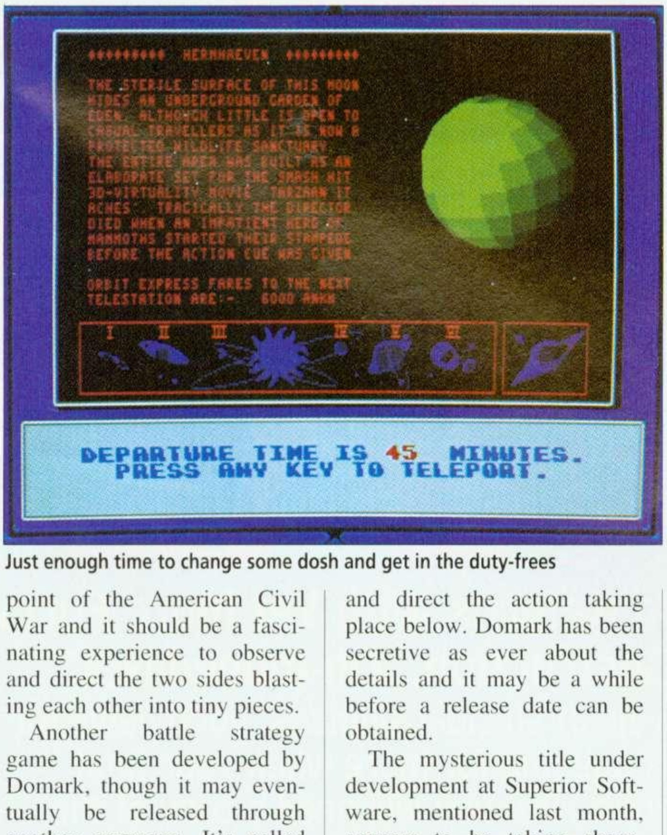
The other new company is called Software42 and it is a dedicated Acorn outfit which will have a large clutch of games at the show including *Ixion*, a 3D vector puzzle solver. It has ambitious plans to exhibit a flight simulator called *WolfPack* on the stand as well as a cutsie platform game, a beat 'em up and a shoot 'em up. For the future, a company spokesperson said, there are firm plans for Amiga conversions.

Another bit of gossip – the Coinage team, of *Pesky Muskrats* fame, is working on an Archimedes version of the superb game *Paradroid-90*. This originally came out on the Commodore 64 and has been a hit on many formats ever since. In it, you play a small droid among many other bigger droids and you must take over their personalities in order to clear your spaceship of rogue robots.

Fans of more cerebral games will be pleased to hear that Turcan Research systems, which brought us *Waterloo* and *Dreadnoughts*, has revised the latter to run cheek by jowl with Risc OS and will have both this and also an original simulation of the battle of Gettysburg at the show. Gettysburg is regarded as the turning



Guile: Catch a bus and planet hop, but only if you've earned the fare



Just enough time to change some dosh and get in the duty-frees

point of the American Civil War and it should be a fascinating experience to observe and direct the two sides blasting each other into tiny pieces.

Another battle strategy game has been developed by Domark, though it may eventually be released through another company. It's called *Nam* and is a purely strategic simulation of the Vietnam war, in which troops and resources must be managed efficiently to ensure victory. You observe all this, godlike, on an overview map of the entire country and direct the action taking place below. Domark has been secretive as ever about the details and it may be a while before a release date can be obtained.

The mysterious title under development at Superior Software, mentioned last month, appears to be taking shape. The working title is *Ego* and when it comes out, probably late October, it will be a simultaneous release with the 16-bit versions. However, the elephant character who features as the hero on the standard version may well be absent from the Acorn game: there's a strong rumour that a certain lizard may well be back in town. Yes, *Repton* is (probably) back! *Ego* will involve collecting bits of a set of jigsaws, negotiating the usual logic puzzles and assembling the pieces against the clock. It sounds mighty good and it will be nice to see ol' scaly-face again.

Some advice for those of you holding your breath, waiting for release two of *Karma:* sneak a few puffs or you risk turning blue in the face. Periscope Software reports that although work is 'progressing steadily' it will be five months before voyagers can really go where no man, woman or thing has ever been before. Even if such an accomplishment seems unlikely, *Karma* will at least have achieved a separate milestone: it will soon be five years since the project was first begun!

Finally this month, a new game going by the name of *Guile*, from the authors of *Air Supremacy,* should be available at the show. Coming from another new company, Dream Ltd, it's a sort of a *Zarchy, Elitey* affair, in which you play a poor humble character who has to earn his bus fare to the next planet by trade and cunning, using dog-fighting skills. You fly around in a complex series of underground tunnels, depicted in 3D, picking things up and doing battle with all and sundry. The nearly-finished version is very funny (there's an ice-planet called Chillianosov) and great fun to play. Keep an eye out for it at the show, along with all the other new releases. Looks like October 16th is Games Day!

Matt Tizard

THE FUTURE BECKONS

The last few years have been frustrating for Archimedes games fans. Here we sit, with the most colossally technically superior home micro in the entire cosmos, and all the prizes in the games sweepstakes are swept by competitors of the ilk of the Amiga, the PC and – heaven help us – the poor old Atari ST.

There are three reasons for this. First, the Arc has a poor showing in the global market, and the games market is quintessentially international. Second, it's always been just that little bit too expensive. Thirdly it's always suffered from its lack of a standardised joystick port.

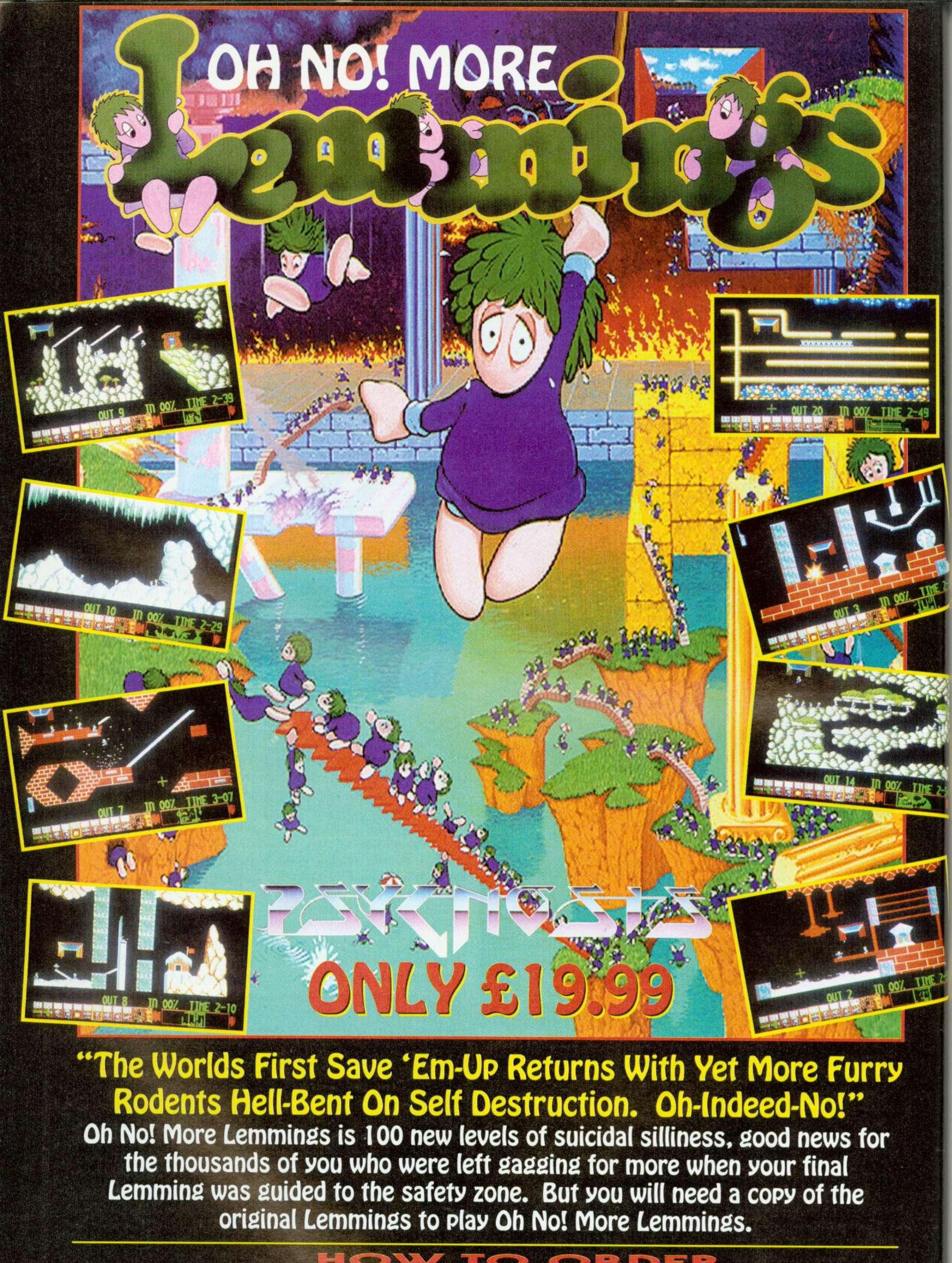
All this is due to change with launch of the new range of Acorn game machines (see page 19). Some would still argue that at £499 inc VAT, the new A3010 is still a tad too costly compared with, say, the new Amiga A600.

But the important thing is that Acorn has finally broken through the £500 barrier, which is the point at which software houses are prepared to consider a platform as being a games machine. And – it has a standard nine-pin joystick port. No more key punching!

The signs of change are already with us. *Guile* and *Ixion*, pictured on these pages, are both from entirely new software houses, chancing their hands in what may be the new land of opportunity, and a vast avalanche of conversions of classics from other machine formats is in the offing.

And we have one advantage here in the Acorn world – we'll only get the best as all the dross has been sifted out.

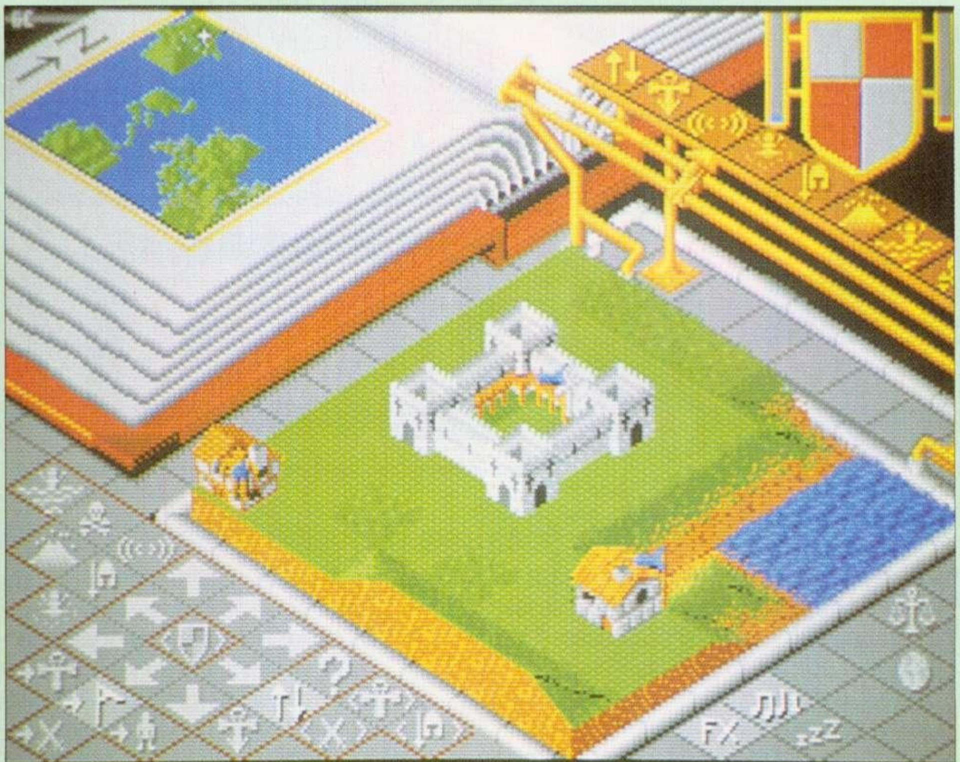
Fin Fahey



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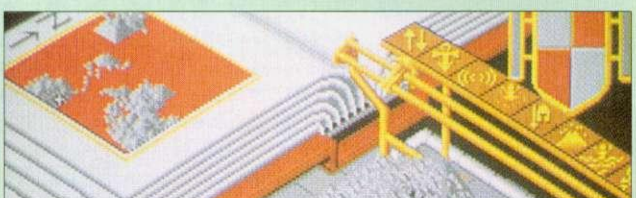
Having God on your side means a centrally-heated castle, three square meals a day and a dishwasher . . .

Populous has finally found its way on to the Arc. This is one of the small handful of games that seizes people's imaginations and refuses to let go. When it was released in the 16-bit world, it spent the best part of 1989 at the top of the software charts.

I think the appeal of the game is similar to that of *Lemmings* – people seem to love absolute power being handed to them on a plate so that they can wield it in unnecessarily large amounts. There's plenty of wielding to be done here, since you take the role of nothing less than a deity; albeit a paranoid deity with a mischievous nature, but really quite well-meaning. The problem is really that 'this universe ain't big enough for the both of us', since another evil deity is trying to muscle in and gain more followers than you. What you must do is mould the world using your great powers and influence your followers to 'crush the misguided'.

Battle takes place in an enormous number of different worlds, some predefined, some computer-generated, which you share with the evil people. The terrain of each has a different graphical theme, such as a desert or arctic region. You view one small portion of the world from an isometric viewpoint and you can scroll over the whole landscape at will. It's all in 3D with hills, valleys, rocks, vegetation, settlements and lots of people dotted about. From your vantage point you have access to a number of control icons which can be used to influence the behaviour of the people who follow you.

Your incarnate representative is the leader of the people, who carries an ankh (a sort of Egyptian cross) about with him. The leader of the evil people lugs a big skull around! Up at the top left is the *Book Of Worlds* which shows a map of the current world, with coloured dots representing people and buildings on it. You can click on any point on this map and the central area zooms straight there.



. . .but this could happen when you back a loser

The 'walkers', as your people are known, are initially primitives scattered over the land. You instruct them, not individually, as in *Lemmings,* but collectively. They exhibit their devotion to you by worshipping at your shrine when instructed or by merging to form stronger men who have a better chance in battle.

The best way to increase the size of your domain and produce a fruitful populace is to flatten out the local land and instruct the chaps to settle down and build on it, which they proceed to do with glee. If you keep helping them they soon get better at it and they progress on through wigwams, wattle and daub huts, houses, forts, and finally castles.

At any time you can use the Query icon to obtain information about any member of either tribe, providing information on strength and how primitive or developed they are. Query can also be used to click on the flags of settlements to see how full and well-defended they are. You have no control over the hand-to-hand combat and so you leave them to it. It's great fun to watch, though.

Some of the control commands require the expenditure of *mana,* which is a reserve of divine influence and some is used up every time you zap the earth with your celestial power. The 'divine intervention' special effects which drain your *mana* include earthquakes and volcanos, and you also use it up when you sculpt the landscape.

If you're into mass carnage, then the Armageddon option will be of interest; here both sides' shrines are placed together in the middle of the map and a ding-dong battle involving everyone ensues.

The graphics and atmospheric sound throughout are both superb, and there is a plethora of game options: you can customise more than 60 parameters, make the computer play itself or adjust the maps to your own designs. There's even a tutorial mode for beginners. There is enough here to keep you glued to your Archimedes for some time. If this isn't a smash hit, I'll eat my mouse! *Populous 2* is already on its way, but that's another story . . .

Mathew Tizard



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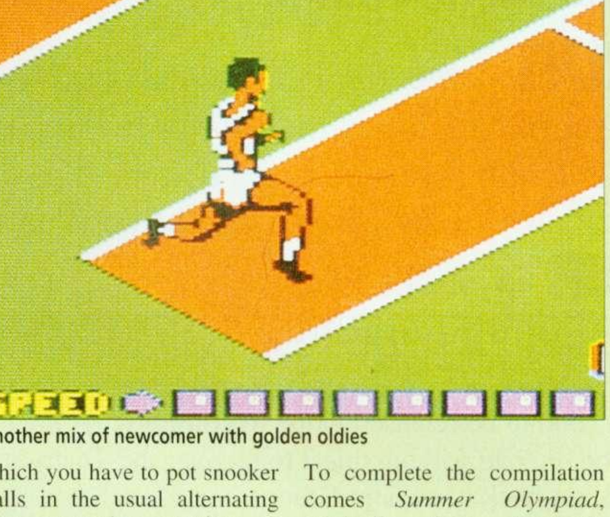
Superior's formula of bundling oldies with new releases all for the price of one shows no sign of stopping or, indeed, becoming anything less than exceptional value for money.

Most interestingly on this compilation is a conversion of *Tactic*, not from Beeb to Arc but from Arc to Beeb. As you may remember, *Tactic* involves piling up the bewildering hail of funny blocks and balls which tumble from overhead and making structures with them, according to a specification given you by the computer for each level.

You might have to make, say, three towers of four of the same blocks or a diagonal line of three for example. Anyway, this all sounds easy enough, until you get to the later levels, which become very frenzied, especially with two competing people playing different games at once. This is a pretty faithful conversion and loses none of the atmosphere of a game where atmosphere is everything, and presentation is secondary, although that's good too.

Fondly remembered by anyone who ever zapped aliens with intent on their Beeb is a real classic – *Video's Revenge*. The game itself resembles a vertical version of *Defender*. You cruise up or down against a backdrop of parallax stars, mercilessly annihilating all who stand in your way. Bonuses can be collected to give you 'inviso-flight' which enables you to hide from the nasties, or triple firepower. Here are some of the most vicious aliens I have encountered, including those clusters of little swarmy horrible things, as in *Defender*. If you're after an alien-frying challenge, this is for you.

Masterbreak is an entertaining, if infuriating quiz game in which you have to pot snooker balls in the usual alternating way, answering questions as you go. Reds are general questions, and the colours correspond to categories, but it's all over as soon as you make a single mistake. The game really comes into its own with more than one player, and then it generates the maddening atmosphere of all trivia games.



Another mix of newcomer with golden oldies

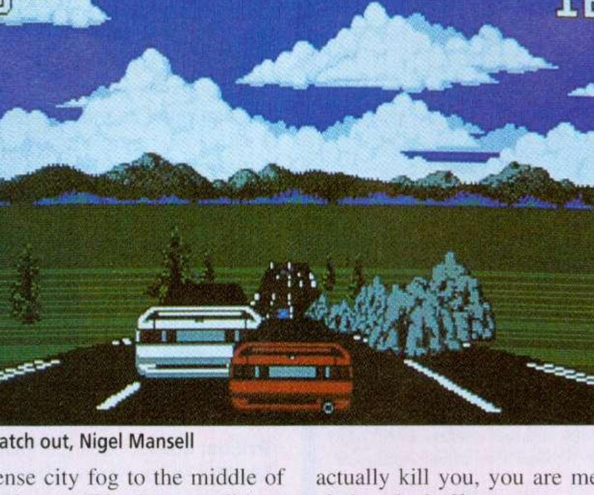
To complete the compilation comes *Summer Olympiad*, originally from Tynesoft, where you compete in fencing, skeet shooting, hurdles, triple jump and high diving. Each of the events is adequately simulated, but I felt that the fencing event was unpolished next to the others. All in all, though, a good buy for Beeb owners.

James Spurdon

LOTUS TURBO ESPRIT

Krisalis
Tel: (0709) 372290
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Risc OS machines

I can remember when a racing game was a matter of looking down from an overhead vantage point onto a race-track and observing tiny little flat buggies that chugged slowly around the course. Those days are long gone. Here we have a grown-up racing game of the sort that will makes your stomach temporarily migrate to your mouth when you go over a hill.



Watch out, Nigel Mansell

Lotus Turbo Esprit puts you behind the wheel of an extremely powerful machine. This is self-evident when you look at how smoothly the road twists and turns from side to side as well as up and down, causing something akin to motion sickness. Each of the eight levels is a different driving environment ranging from dense city fog to the middle of a desert. Weather conditions are usually against you, but the car responds to its environment superbly, skidding on ice, slushing through water and getting tangled in tumbleweeds. If you hit a log, you are catapulted into the air for several metres! You have to watch out for rocks and ice on the roads, but nothing seems to actually kill you, you are merely knocked off course.

Roadside objects, advertising hoardings, trees and cacti are all effortlessly scaled up as you zoom by, providing a strong feeling of depth to the display. The Arc seems to have no trouble in maintaining a smooth frame rate throughout even with snowflakes everywhere or rain falling. Small graphical touches add to the atmosphere – you can see the wings of rival cars when alongside them and the tunnels loom up at you as you enter them. There is even a scenario on a motorway that has no central reservation and consequently it is all too easy to stray onto the other side of the road and have to face the oncoming traffic. After you've done that once, there is not usually a second time!

You have the option to race with an automatic or manually controlled gearbox and the game becomes really exciting when two people simultaneously compete against each other. In two-player mode, the screen is divided into two and you share the keyboard, the track, the race and a ruthless desire to win with another manic Lotus player.

This game shows great attention to detail, and provides the competitive thrill which is the hallmark of all really good driving games. Another winner.

Josef Koestler

OH NO! MORE LEMMINGS!

Krisalis
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£19.99
Risc OS machines

Just when you thought it was safe to switch on your computer, along come more of those kamikaze rodents, the one and only lemmings. If you have already seen the original game, you'll know the idea is to save as many of the little green guys as possible from impending death.

Lemmings are pretty stupid creatures and will wander around aimlessly, walking into all sorts of dangers and traps. Stick a lemming in front of a perilous cliff and it will quite happily amble over the top to meet its maker.

The idea is to get a number of lemmings from a small hatch to their home in a set time. Life is never simple, though, and there are usually a few obstacles over, under or through which the lemmings must travel. Each lemming, and remember there can be up to 100 running around on screen at once, can be given a task to help his fellow victims, such as building bridges or digging holes. Lemmings can be made into 'Blockers', who keep the others at bay while bridge builders or tunnelers do their thing.



Oh no! – the little stumpy green ones are back!

The first few levels of the game, of which there are 100 ranging in difficulty from 'Tame' to 'Havoc', are very easy and get the player used to what's what. After that things take a distinctly difficult turn, and it's not long before the hair-tearing begins. Further into the game, as well as getting past obstacles, the lemmings must navigate different 'traps' such as steam hammers and nasty spikes. These are to be avoided if you don't want the job of cleaning up bits of lemming, the result of a liaison between creature and machine.

Like the original *Lemmings*, the graphics are extremely well drawn considering they are all in Mode 9, that is 16 colours. New backgrounds range from rocky caves to snow-covered tundra and even new lemming homes have been designed so they fit the new scenarios.

Musical accompaniment is provided with 25 new tunes that bounce along in a lemmingish kind of way. In addition, humorous sound effects are used liberally, such as 'Let's go!' and 'Oh no!', which signify the beginning and end of a lemming.

Oh No! More Lemmings! is actually a supplement disc which means that you'll need a copy of the original game in order to play. If you already have *Lemmings*, £19.99 does not seem too much for the extra screens. If however, you don't have either, you will have to fork out almost £45 for the privilege.

Rob Miller

CYBER CHESS

Fourth Dimension
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Risc OS machines

Cyber Chess, the latest offering for chess fans, tries hard to overcome the failings of other chess programs.

Most commendable is the attempt to cater for the full range of abilities. A well-presented tutorial for complete beginners is provided and the program itself offers a beginner's mode whereby the computer can be forced to play 'badly' until you get the hang of the game.

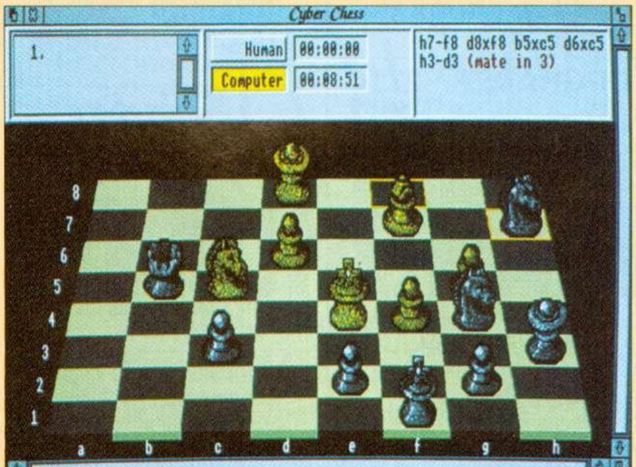
Much is made of 3D displays – *Cyber Chess* offers both 2D and 3D, although the perspective is not very convincing. However, many chess players prefer to copy moves on a real board, so this is a minor concern.

The game is recorded in a window and clicking on any move will set the board to that position, a feature very useful for post-mortems. And you can save games as text and *Draw* files so that they can be DTP'd if you wish, something that chess enthusiasts and clubs might find helpful for presenting their games.

But how does it play? The standard test is to play it against another program, so I pitted *Cyber's* might against good old *Chess* from David Pilling Software.

Setting *Cyber* to full strength, I played two 10-minute, two 30-minute and two 90-minute games between the programs. *Cyber* seems to use 'real' time whereas *Chess* appears to only count 'thinking' time, so to compensate for this I reduced *Chess's* allocation until both programs seemed well matched. The results were quite surprising.

Chess beat *Cyber* in both 10-minute games but the two programs won one game each in the 30-minute and 90-minute categories, giving *Chess* a slight edge in performance. Oddly, all four longer games were won by black.



Cyber Chess lets you play in three dimensions

Chess won its 90-minuter by a neat trick which captured the queen. In the other long game, *Chess* ran into time trouble and after a rambling endgame, *Cyber* promoted a pawn and won. Computers are notoriously bad at endgames; *Cyber* offers nothing new.

I also tried *Cyber Chess* at a problem or two. White must mate in three moves in the position shown, which *Cyber* solved in about eight minutes on an Arm3 machine. *Chess* found the winning move in just under six minutes.

David Pilling's *Chess* costs much less and plays better and, although *Cyber Chess* can cater for beginners, at £50, I would expect much more for my money.

David Acton

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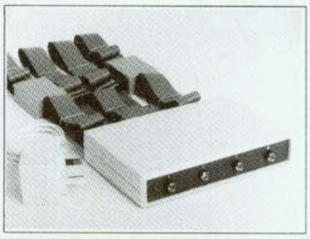
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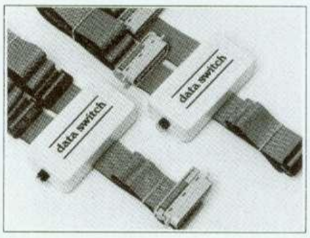
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QUESTIONS AND ANSWERS

Q I have an A3000 computer and an Epson LX-400 dot matrix printer. I have tried to print pictures which I have created using *Draw*, but I have always been unsuccessful.

I've been told to drag my save file to the PrinterDM icon, once it is loaded on the desktop. I've tried this many times, but have not been able to print a picture yet. Can you help me?

Chris Osborne
Hants

A Assuming you can print from other programs, your computer and printer are probably all right, so you can check whether the software is the problem using this routine: Load the Applications 1 disc and install PrinterDM on the desktop. Drag the DrawDemo file until it's on top of the dot-matrix printer icon and let go of the mouse button.

If it doesn't print out, use the Select and Menu buttons on the mouse to make certain the driver is correctly set up for your printer – probably an Epson FX setting connected to the parallel port. Try printing DrawDemo again. If this still doesn't work you may have a problem with the application.

Another possibility is that you're trying to print your data before the desktop has seen *Draw*. In this case, your file appears in the disc window as a white box instead of the normal drawfile icon and when you try to print, you get a message which says "I don't know how to print draw files, shall i print it as plain text" (YES/NO).

This message varies from machine to machine, for instance it could say, "Confirm: This is a type &AFF file; do you really want to print it?" (YES/NO).

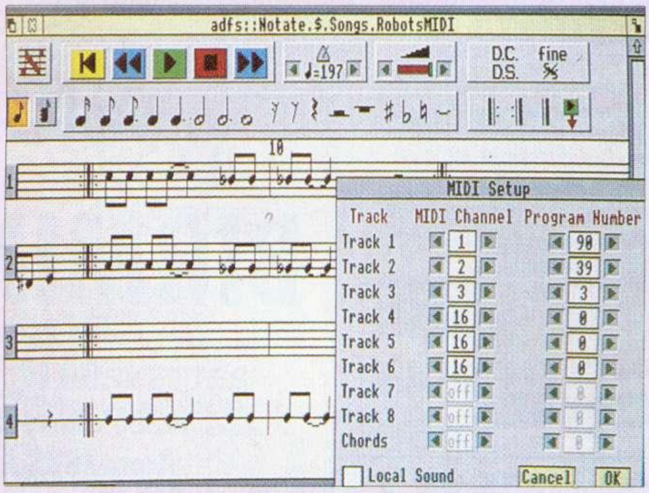
If you say YES, anything could happen – the printer will probably hang up or print gibberish. The computer is trying to print your picture, but it doesn't know how. If you install *Draw* on the desktop before printing, your problem should be solved.

STAR QUESTION

Q My computer is an A5000 on which I have *Maestro* and *Notate* music software. I also have a Casio CT-670 keyboard which has sockets marked 'MIDI IN', 'MIDI OUT' and 'MIDI THROUGH'. What do I need to purchase to connect the two and will it prove expensive? My mind goes blank when faced with sockets, wires and circuits.

Elaine M. Jones
Clwyd

A To start with, you need a Midi card and a cable to connect the computer to your keyboard. Cards cost around £70 and take the form of either an expansion podule (e.g. Acorn, EMR) or a small circuit board that plugs into the Econet slot (Vertical Twist). Neither are particularly difficult to install – you just unscrew the lid and plug it in. Then you can think about software. *Maestro* is designed purely for internal sound and is not Midi compatible. *Notate*, on the other hand, has a Midi output facility which allows you to play music back through your synthesizer. If you want to use the Casio to play notes into the computer you'll need more software. These vary in price from about £70 for a keyboard tutor to £200 for a full-blown sequencing package.



Notate gets on well with synthesizers

Q For my major GCSE CDT Technology project I am building a computer controlled floor robot using the user port. Programs that access the BBC user port write to a memory address. Is this possible on the Archimedes?

Chris Hinds
Surrey

A Yes, it is, assuming that you have an I/O podule for the Arc. However, if you want to keep your software neat and easily portable between different hardware versions, I recommend that you talk to the user port via OSBytes &96 and &97.

If, for some reason, you must circumvent the operating system, this is how you do it: The Arc makes extensive use of relocatable modules and the addresses you require will vary according to what is installed. It is, therefore, essential that your code asks the opsys where these locations are each time the program runs. To do this, find the start of SHEILA by invoking SWI "I/O_Podule_Hardware" which returns (in R1) the base address of the I/O Podule. SHEILA starts at &2000 above that, though this may vary between podule versions. As the podule stores variables in four-byte words rather than bytes, the offsets you need are their BBC equivalents shifted by two bits (i.e. multiplied by four). This means that the User/Printer VIA lives at SHEILA addresses &180 to &18C instead of &60 to &6F on the Beeb.

For more details about programming the User Port, consult either *The Advanced User Guide* for the BBC Micro, or the *BBC Master Reference Manual*.

Q I am desperately seeking a wall-mounted, articulated bracket or stand to hold the AKF17 monitor I use with my A3000. I have been advised not to use a TV wall bracket as they are not deep enough to hold the monitor safely. Have you any ideas?

Jean Raza
Leighton Buzzard

A Monitor supports are very common in the PC environment. There is such a variety of monitors available I'm sure you could find one. A good place to start looking is in free accessory catalogues from business suppliers like Misco.

Q I am a keen BBC Micro user and have had my model B since 1982. I want to buy some of the older classic games and utilities but none of the shops in my area sell them anymore, so where do I go? I also get problems with my cassette tapes. When I type *TAPE <RETURN> and then CH."" <RETURN> nothing happens. All I get is the sound of the tape through the Beeb's speaker.

Conrad Gay
Cornwall

A **Although most of BAU's advertising deals with products for 32-bit machines, careful inspection of these pages shows a number of dealers who still sell BBC games and utilities. Dabhand Computing (061-766 8423), Software Bargains/Mercury Games (0532 436300) and Watford Electronics (0923) 237774, to name a few.**

On the cassette front, it's likely that the signal is either too quiet or distorted in some way. Try cleaning the tape head and pinch rollers with a little isopropyl alcohol and if that doesn't work, try another tape recorder. If this fails, you've got a hardware fault and your machine may need to visit the menders.

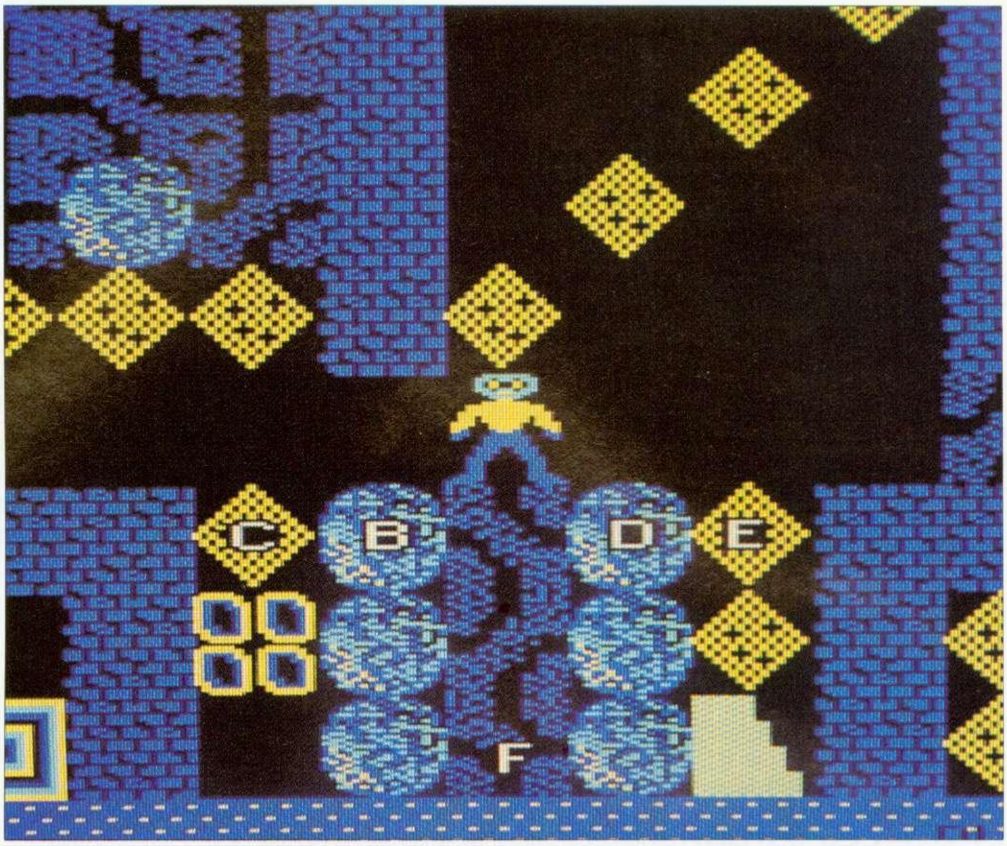
Q Please help me with a problem that is seriously affecting my A3000. Sometimes, on power up, I get error messages like "Address Exception at . . ." and "SWI not known" before the Desktop appears.

When I list the modules, nearly all of them are dormant and they don't always come back when I reset the computer. None of these problems existed before I installed a 1Mb memory upgrade, but I would hate to think that this was the cause. I have a list of suspects; a hardware fault, a virus in the Cmos Ram, a flat battery (the machine is over two years old) or a faulty upgrade. What do you think?

Stephen Scott
Surrey

A **It's not a virus, because the little beasts only infect magnetic discs and, so far, no one has invented one that actually eats silicon. In an A3000 this problem might be caused by a memory upgrade not sitting on its pins properly.**

Giving it a quick wiggle will cure it temporarily but it is best to remove the upgrade, which is not easy, and clean the pins with some alcohol. You may have a hardware fault but my money's on the flat battery. Try replacing it, then reinitialising any dormant modules, reconfigure the machine and see if the problem recurs.



Repton lives! You may not be able to run all your old favourites on the Arc, but you can still buy them for the Beeb

Q When I sold my Master Compact and bought an Archimedes, I anticipated that some of my old favourite games such as *Repton 3*, *Citadel* and *Elite,* which I find more addictive than their Risc counterparts, would work on my Archimedes as though I still had a BBC. But this is not the case.

The Emulator struggles to load anything more than *Ghouls* and it does even that badly. I assume that the Emulator supplied on Applications disc 2 turns the Archimedes into a BBC B which works just about perfectly, and that my problems arise from using ADFS versions of the software. Is there a Basic command I can use to make everything run fine?

Chris and Mike Hayles
Coventry

A **It would be nice if there were a magic button on your Archimedes that could turn it into a precise simulation of any other computer you've ever used but, sadly, there's not. In fact, your problem is probably the software itself, rather than the fact that it's a Master Compact version. When the manual says '65Host substantially emulates a BBC Model B microcomputer', it means it will cope with 'legal' Basic and a certain amount of 6502 code (perhaps 75 per cent of all BBC programs written).**

This doesn't mean that it runs powerful, sophisticated games that push the design to its limits. Games programmers are notorious for using every available trick to make things bigger and faster so it is their work that often defeats the Emulator.

Machine emulation, like so many things, is subject to diminishing returns and the cost of producing a 100 per cent 'virtual BBC' on an Archimedes, assuming it has the power to do it, would be phenomenal.

Q The National Curriculum document for mathematics assumes that schools have computers and requires their use in certain areas, for example, 'using spreadsheets to explore number patterns'; 'using computers to generate and transform 2-D shapes'; 'devising instructions for a computer to produce shapes and paths.'; 'inserting, interrogating and interpreting data in a computer database' and 'using a computer to investigate whether a sequence given iteratively converges or diverges'. Can you tell me what relevant software is on the market?

D. J. Luke
Salisbury

A **Although the authors of the National Curriculum were committed to the development of Information Technology in Education, they also tried to avoid making schools spend extra money because of their 'innovations'. So most exercises suggested in attainment targets involve cheap, well-established software.**

Most of the data-handling problems can use any database and spreadsheet, from old faithfuls like Newman College's *Grass* and *Grasshopper* on the BBC, through to modern stuff like Colton's *Pipedream4* and Longman Logotron's *Pinpoint* on the Archimedes series. The 'shape and space' references are all aimed at the Logo programming language, implementations of which are available for all

Acorn machines. It's also worth looking at the SLIMWAM series of discs from the Association of Teachers of Mathematics (0332 46599)

Q After much deliberation over whether to buy an Acorn computer or a PC, I recently purchased an A5000 and am very pleased with it. I plan to use it to write software for designing optical systems and other applications of a mathematical and technical nature to run on the Desktop.

These programs will involve enormous numerical computions that would be aided by a numerical coprocessor and a compiler. When is Acorn planning to release such a coprocessor for the A5000? Are there any compilers currently available with an option to generate code for a coprocessor? I could use a C compiler at the moment but am reluctant to spend up to £200 on one if I then have to upgrade it when a new chip is released.

N Ellis
Old Harlow

A Although the Acorn floating point co-processor has yet to be released, the machine codes required to operate it are part of the original reduced instruction set, designed at the same time as the first Arm chips.

Current C compilers already create floating point instructions by default which are sent to a software module called the FPE (floating point emulator). When a floating point chip becomes available, existing code should address it without difficulty.

CORRECTION BOX

In August's Q&A, we said that JPEG was a proprietary format belonging to DT Software. This is not the case; JPEG is a public domain file format developed by 'workstation' programmers, and its authors positively encourage its use. *!JPEG*, on the other hand, is an Acorn compression application belonging to DT that creates JPEG format files. JPEG compression is also available in the public domain, via bulletin boards. Thanks to Eivind Hagen in Norway for this correction.

Q As a budding keyboard player, I would like to be able to make full use of Midi, being able to save and replay tracks on a sequencer. My first thought was to get an Atari ST with a C-Lab application, but why should I buy an ST, when I already have an A3000? Does anyone produce such a package? I can't find one.

David Wilson
Winchester

A If ever there was an application that cried out for a multi-tasking Risc processor, it's music sequencing but, to date, few manufacturers have taken up the challenge.

C-Lab's *Notator* for the ST has got to be one of the finest music applications available on any platform, but £850 for a new computer and software is an expensive way of 'dipping your toe' into Midi sequencing. At present, there are two Arc sequencers on the market that you may wish to look at, with rumours of more on the way. Check out Pandora's *Inspiration* from Ampsound (0727) 50075 and EMR's *Studio 24 Plus* (0702) 335747.

If want to work with stave notation, look at Clare's *Rhapsody II* (0606 48511) and Longman Logotron's *Notate* (0223) 425558.

Q As a student who has just survived GCSEs and hopes to pursue a career in Electronic Engineering or Information Technology, I wonder if you can advise me of any software I might find useful in my work?

David Winters
Dromore, Co. Down

A For your future career, I would start with a wordprocessor and probably a graphical spreadsheet (*Pipedream 4*, *Eureka*) and decide on further purchases later. If you follow an IT or engineering path, you might well need a CAD package and/or a C compiler.

Q I have seen demonstrations of Acorn machines with flashy PC-style 3D icons on the windows. How can I get these icons on my A3000? Is it just a case of redefining the sprites ?

Mohammed Ibn Habib
Khartoum

A The icons you have seen are a feature of Risc OS 3 and cannot be obtained on your A3000. When Risc OS 3 is available, then you can define your own.

CUSTOMER HOT LINE

Every month in BAU, Alan Glover from the Acorn customer service department offers you Acorn's advice and support

Becoming a Power-User – Part 3

We conclude this look at some of the features of RISC OS that make life easier by examining new RISC OS 3 features. Some of these require the support of the application concerned to work.

- Dragging one or more objects between two directory viewers copies them to the directory. If you hold down the SHIFT key the objects will be moved rather than copied. On RISC OS 3 objects will be renamed rather than copied if possible.
- Help (ie from !Help) is now available on menu entries.
- Clicking on the Toggle Size icon with SHIFT held down will open a window to it's largest possible size without obscuring the icon bar.
- If you drag a scroll bar with the Adjust button and the window has both vertical and horizontal scroll bars the pointer will temporarily disappear, and the mouse can be used to scroll the window in both directions while you hold Adjust down.
- If you click Select within a directory viewer in a position which is between objects, you can then drag a rectangle around all the objects which you wish to perform an operation on. Individual objects can be added or removed from the group by clicking Adjust on them.
- Clicking on the close icon of a window with SHIFT held down does not close the window, but instead 'iconises' it on to the Pinboard (the Backdrop program). Double-clicking on the iconised window restores it to full size.
- While a window is iconised, you can get at the relevant menu for that window by using SHIFT-Menu with the pointer over the iconised window.
- SHIFT-F12 brings the icon bar to the front of the desktop (beware applications which also use it!). It can also put it back at the back.
- CTRL-F12 starts a Task window.

QUESTIONS AND MYTHS ABOUT VIRUSES

Viruses are becoming more common on RISC OS machines, so here are a few common queries answered (see page 146 for more information)

- Should I inoculate my files ?

Do not use any inoculation program. It is not possible to simultaneously inoculate against all the known viruses.

- I've got a recent version of a virus killer and that doesn't find anything. So I'm protected, right?

Wrong. The virus scene changes very rapidly. If the program you are using is more than three to six months old, it will not detect the newest viruses and newly discovered strains of existing one. Futhermore, using an out-of-date program gives the possibility of spreading a virus through your system as it scans, and of corrupting data when attempting to disinfect a file.

- Can a virus reside in the CMOS Ram ?

No. The CMOS Ram is only used for data storage. Program code is never executed within the CMOS Ram. In addition, it is only 240 bytes long. However, some viruses do use CMOS Ram locations for data storage.

- Can a virus survive a CTRL-Reset ?

No. However, it will probably not take long to reload it – see below!

- How can I be infected with a virus ?

Opening a directory viewer on a directory containing an infected application is enough – you don't have to actually use an application that is infected.

● 1st Word Plus release 2, unregistered, excellent condition – £50. Contact Geraint, Cardiff. Tel: (0222) 227687

● A3000 L/C only nine months old, 2Mb memory, TV modulator, 5.25in disc interface and drive, PC Emulator VI.7, 1st Word Plus, Genesis, Arcticulate, games, manuals and much more – £700 ono. Contact Mr M Dawe, Canterbury. Tel: (0227) 700516

● BBC Master 128, twin disc drives, in Viglen console, colour monitor, Marconi Tracker Ball, Eprom programmer, as new including all manuals – £400. Contact Mr I Benton, Derbyshire. Tel: (0602) 301917

● BBC B, single sided 40 disc drive, Wordwise Plus – £210, Epson LX80 printer – £210, Philips 80 11in mono green VDU – £50 little used, all manuals included. Contact Mr C Murdoch, Stirlingshire. Tel: (0324) 485686

● A3000, excellent condition complete with Pres monitor stand, quick sale – £425. Contact Mr M Kohut, Derbyshire. Tel: (0773) 829217 eve

● BBC Master plus turbo board, 30Mb hard disc, dual drives, Cub monitor, Modem, Citizen printer, dual plinth plus loads of software – £600. Contact Mr S Pursey, Greenford. Tel: (0850) 36255

● BBC B, tape player, joysticks, manuals – £150 ono. Contact Miss S Steggall, Wiltshire. Tel: (0672) 515487

● Acorn Electron with introductory cassette plus over 40 games including Repton Infinity and Computer Hits 1&2 – £100. Contact P Wise, Merseyside. Tel: (051) 678 2957

● 30Mb master hard disc in VGC – £150, Demon 2 Modem – £50. Contact Chris, Norwich. Tel: (0603) 868357

● Acorn DTP – £25, 1st Word Plus – £20, Wimp game – £10, all prices ono. Contact Mr R Walker, Shoreham. Tel: (0273) 452533

● A3000 Watford 1Mb Ram upgrade with fitting instructions. Less than one years use – £30. Contact W J Mahoney, London. Tel: 081-698 2835

● A300, colour monitor, plinth, 2Mb applications discs, manuals plus some games, three months old, as new – £680. Contact Ken, London. Tel: 081-521 4559

● A3000 4Mb, TV adapter, games, 30+ discs, PD graphics etc. Sale due to upgrade – £650 ono, 14in colour TV – £50. Contact Mr L Wilson, Gwynedd. Tel: (0248) 712635 anytime

● Master 128, Microvitec colour monitor and stand, 40/80 Cumana disc drive, Morley Teletext adaptor, Viewstore Rom, various educational and games software – £500 ono. Contact Mr A Spraggon, Newcastle Upon Tyne. Tel: 091-273 7897

● BBC M128, Microvitec 1451 monitor, twin 5.25in double sided drives, Acorn Teletext adaptor, all boxed with manuals – £450. Contact Mr K Dailey, Harpenden. Tel: (0582) 761393

● Master 128, Interword, View, Spell, Cub colour monitor, 20Mb Winchester and 5.25in 40/80 Cumana drive, all manuals – £500 ono. Contact Colin, Middlesex. Tel: (0992) 762246 eve

● Electron 64K Turbo, Slogger Rombox plus with printer interface, plug-in disc interface (Pres), cassette recorder, manuals, leads – £150 ono. Contact Mr P Baldwin, Surrey. Tel: (0483) 763470

● BBC Master 512K, Philips colour monitor, double disc drive, manuals – £450. Contact M Panetta, London. Tel: 081-392 9261

● A3000, colour, 2Mb, 105Mb Scsi, 5.25in drive, software including Acorn DTP, 1st Word Plus, Schema, Genesis, Graphbox, PC Emulator, Lotus 1-2-3, games, all manuals – £949. Contact Mr Jones, Clwyd. Tel: (0492) 516285

● Beebug C development system unopened – £50 or swap for PC Emulator V1.8. Contact C Horsley, Gwent. Tel: (0873) 853538

● A3000 Archimedes and Multisync monitor NEC, lots of software – £700. Contact Mr Mourik, Dyfed. Tel: (0269) 851044

● A3000 2Mb, Microvitec colour monitor – £580 ono, Serial Port 92Mb 16-Bit Scsi and interface – £350 ono, perfect boxed etc. Contact Mr D Lane, Bournemouth. Tel: (0202) 418875

● BBC B computer plus manuals, games, joysticks, cassette recorder etc – £55. Contact Mrs M Chambers, Suffolk. Tel: (0638) 750014

● Master 512, DFS, ADFS, double disc drive, colour monitor, PC Emulator, Overview, Publisher, many Roms, discs, discbox, manuals, books – £450 ono. Contact Mr W Critchley, Northants. Tel; (0933) 678063

● Archimedes 3140, colour monitor, back plane with extra software, eg PC Emulator, all manuals – £450 ono. Contact Ian, Reading. Tel: (0734) 662301

● A3000, 2Mb colour monitor stand, software and manuals – £600. Contact Mr J Preston, Northumberland. Tel: (0434) 682461

● BBC Master 128K, Acorn View Viewsheet, ADFS Editor, Printmaster, additional Roms on disc, Microvitec colour Cub monitor, 5.25in Cumana disc drive, as new – £350. Contact B Tett, London. Tel: 081-997 5170.

● Juki 6100 Daisywheel printer, high quality print, many fonts – £55. Contact Mr N Bayley, Farnborough. Tel: (0252) 510486

● Watford/Aries IEEE-488 interface for BBC Micro/Master – £48, Red Boxes starter kit and Red 3 home automation system for BBC Micro/Master/Spectrum – £45. Contact R Wright, Guilford. Tel: (0483) 575870

● A3000 with E120 multisync monitor, software and PRM's – £800. Contact Steven, Lancs. Tel: (0282) 843541

● BBC Roms, Viewstore – £25, advanced disc toolkit – £15, Exmon II – £15, Amx mouse and Super Art (master) – £30, various programs – £4 each. Contact M Robertson, Aylesbury. Tel: (0296) 23124

● NEC multisync colour monitor 14in for Archimedes – £170. Contact R Bowden, Ware. Tel: (0920) 466665

● 20Mb hard disc Seagate – £85. Contact Mr J Crabtree (personal), Dartmouth. Tel: (0803) 833755 work number

● BBC B, Wordwise Plus, 40/80 disc drive, Watford Shadow Ram and Rom boards, 60 discs, Mini Office II, manuals – £300 ono. Contact J Lambert, West Ealing. Tel: 081-567 6421

● Wanted: Archimedes A310 or similar and equipment (no rip off merchants please). Cash waiting for a fair deal. Contact R Burnett, Somerset. Tel: (0749) 89554

● Electron 32K (unexpanded) complete with cassette recorder, all leads and games, good condition – only £40, Philips Hires green screen monitor – £30. Contact Simon, Berkshire. Tel: (0344) 777693

● BBC B Issue 7, single disc 40/80 drive, Toolkit and Disc Doctor Roms fitted, books and manuals – £175 ono. Contact T M Mooney, Manchester. Tel: (061) 724 8030

● Computer Concepts Scanlight Junior 256, only a few months old and hardly ever used, exceptional condition, new £235 will sell for – £195. Contact Jason, Somerset. Tel: (0460) 74000 eve

● Wanted: A3000 with colour monitor, very cheap. Contact Mr O Pacey, London. Tel: 071-582 1084

● The Electron User Group! Non profit making, no membership fee. For more details please send SAE to: EUG, 134 Great Knightleys, Basildon, Essex SS15 5HQ.

● Bargain: Archimedes A310, colour monitor, boxed, hardly used – £310. Contact Mr C Maloney, Oxford. Tel: (0865) 722920

● Star LC-10 (9 Pin) B/W printer, as new – £75. Contact Newport Pagnell. Tel: (0908) 612570

● Large bundle of Electron games, worth about £400+ (RRP) – £45 ono. Contact Mr A Wingate, Brighton. Tel: (0273) 684459

● Dos 512 Co-Processor – £70, 65C102 Turbo Co-Processor – £60, AMX Stop Press/Max/real time clock (GxR graphics Rom B+) – £7 each. Contact Mr J Newman, Dartford. Tel: (0322) 862397

● 512K upgrade for Master complete with mouse and Dos – £100, Star LC10 colour printer – £100. Contact Mr G Evans, Mid Glam. Tel: (0685) 370098

● A3000, Learning Curve with colour monitor and stand, 1Mb upgrade and serial interface, five months old as new – £790. Contact Mr S Park, Cumbria. Tel: (0539) 731926

● Master 128 and professional quality Akhter 40/80 disc drive, self powered, both items mint condition and boxed – £200. Contact D Bishop, Newark. Tel: (0636) 525228

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● BBC B, 512K board plus discs, manual, Watford Co-processor – £100 ono, misc BBC bits including 1770 DDFS board. Contact A Woodford, Essex. Tel: (0277) 821620

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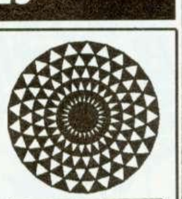
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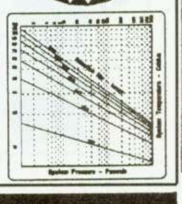
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ACORN USER ADVERTISEMENT PAGES – OCTOBER 1992

£15 STAR LETTER

Reviving old programs does have its problems. When I typed in the *Hemera* listing, (Pieces of Eight, *BAU* August 1992) I discovered that the process of unearthing old listings is not so simple.

The new version of *Hemera* had been RENUMBERed since January 1990 and will not work in its renumbered form. One of the dangers of the RENUMBER command is highlighted here. RENUMBER copes fine with say, RESTORE 1000, changing the line number to a new value.

But when a RESTORE statement contains a variable such as RESTORE x%+10000, RENUMBER fails. Unfortunately the original *Hemera* listing is stacked full of such commands, because of its extensive use of DATA statements.

If anyone else typed in the renumbered version, here's how to make it work. First make these changes:

Line 660, change 1070 to 740
Line 2950, change k=4109 to k=3090
Line 2960, change FOR I=0 TO 3 to FOR I=0 TO 30 STEP 10
Line 4140, change RESTORE f+6140 to RESTORE (f*10)+4170

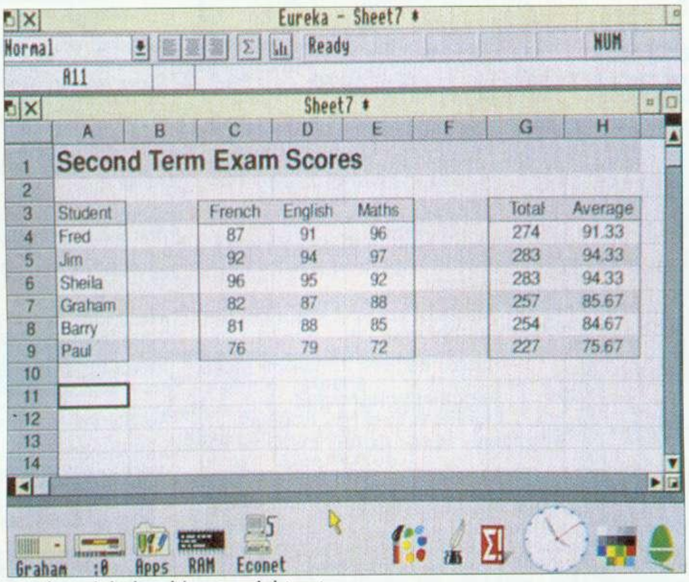
The more difficult problem is getting the Help screen to read in properly, and this involves tweaking the line numbers:

Line 3620, change RESTORE (G*10)+3000 to RESTORE (G*30)-3540
Line 3740, add ,* the the end of the line
Line 3750, delete
Line 3860 remove ,* from the end so it ends f2."
Add new line 3865 to read DATA *

Then you can safely type RENUMBER. This will reserve three lines of Basic for each Help screen (hence the 30 in line 3620).

I hope these changes will help all you frustrated diarists! *Hemera* is very long, but take it from me, once it's right it's worth the sore fingers from typing it in.

Wayne Clarke
Hartlepool



Eureka: might be ultimate, might not . . .

JUST A PIPEDREAM

You seem to have forgotten the first law of computers – software which is heavily hyped before release is invariably late and almost always fails to live up to expectation.

Your gushing review of *Eureka* under the cover banner of 'Is *Eureka* the ultimate spreadsheet?' tells us that rather than being a Risc OS compliant spreadsheet program designed for the Archimedes, *Eureka* aims to be a clone of *Excel (*which version isn't stated) but without major features which 'may be available in a later version'. Hardly the ultimate spreadsheet.

You accept without criticism, Longman Logotron's claim that this will be better than anything that's available. I suggest readers would be better advised to look at *Pipedream 4*, a spreadsheet program that is Risc OS compliant, has been designed for the Archimedes, is not only available now, but is the strong market leader, with 20,000 licenced users. I hope you will agree that this is better than anything not available now and whose collected missed release dates rank high in the vapourware hall of fame.

Robert Macmillan
Colton Software

In our September issue, we did make it clear that the article in question was a preview of *Eureka*, not a review and that bugs were still being ironed out. *Eureka* is also a dedicated spreadsheet, not a *multi*-functional package like Pipedream. As for our banner about *Eureka* being the ultimate spreadsheet: it posed a question, rather than made a statement.

Longman Logotron, rather than hyping the package, was actually very cautious in releasing it to us before the full release version was available. The company already produces many packages for the BBC micro and the Archimedes, but surely there is nothing wrong in using ideas which have been successful on other platforms?

We recognise the success of *Pipedream* – indeed this magazine recently carried a demonstration disc on the cover. Your undeniable market leadership should be a strong enough defence against a new competitor. and we hope to carry an in-depth comparison of spreadsheet packages in a future issue of *BAU*.

ART FOR ARC'S SAKE

I hope someone from Electronic Arts reads this letter, as I am pulling my hair out over the lack of decent art packages for the Arc. Although they do radial gradient fills, all the current Arc packages lack the basic tools and ease of use offered by some packages on the PC, Commodore Amiga or the Atari ST.

Please, can someone convince a software house that they should produce *Deluxe Paint* in Arc format. Before I owned an Arc, I possessed an Atari ST. I will never revert to this make of machine, because the Arc is a far superior computer. However, when *Deluxe Paint ST* was released it pushed the ST to its drawing limits, but didn't suffer from the defect of having an unfriendly user interface.

Deluxe Paint in any format is damn near perfect. I won a prize in one of the ST computer magazines for a picture of a landscape – the picture I drew took only a few hours in *Deluxe Paint*, but would be impossible to create on the Arc simply because the packages that are available can't do simple things like dither fill in two colours, or use any sprite as a brush in any drawing tool, etc. Is this too much to ask?

Grant Naylor
Manchester

Preferences over art packages are quite personal, and tastes vary. There is a package on the Arc that can do dithered fills (*ProArtisan*) and there is a package that can use a sprite as a tool, (*Revelation 2*), but not one package that can do both, and do them well. Maybe with the launch of a low-cost Acorn machine, selling in high street shops (see page 19), we'll see people like Electronic Arts looking towards the Acorn market.

YOUR THOUGHTS

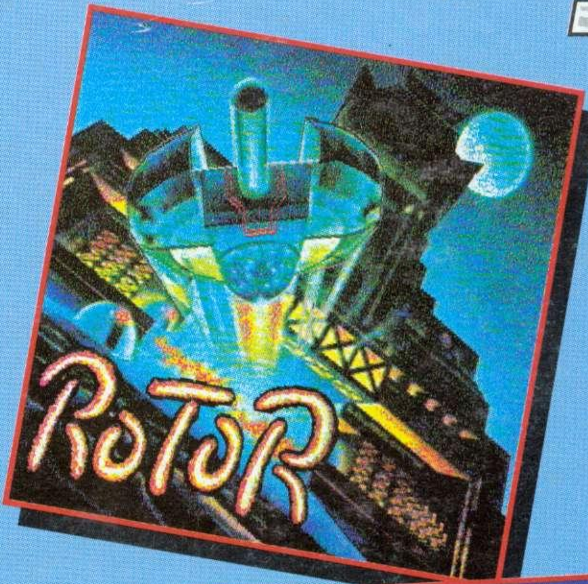
So what do you think about Archimedes graphics packages – are they good enough? And will the new machines change your view of Acorn? How do you rate our reviews and feature articles?

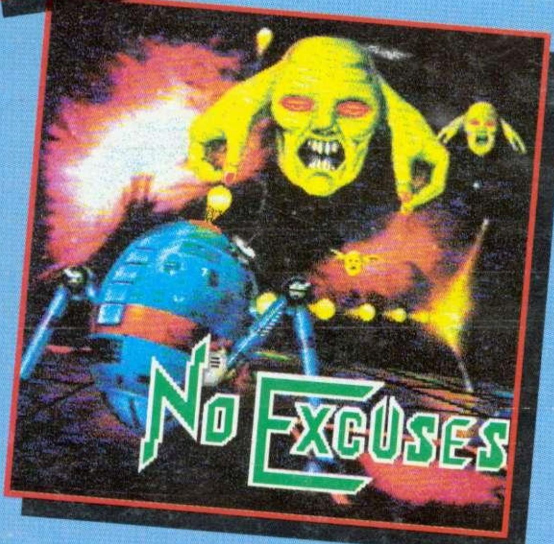
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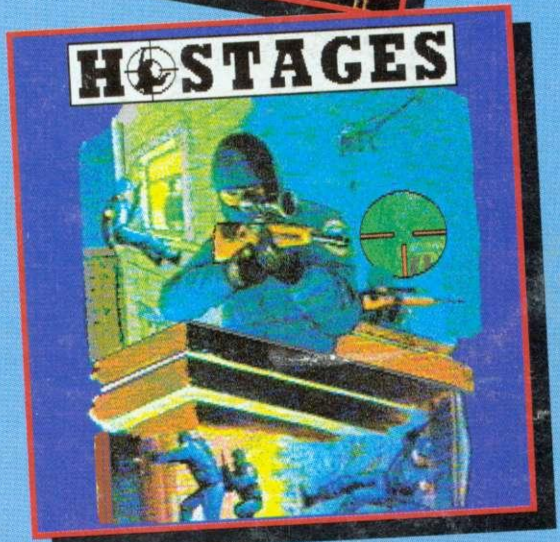
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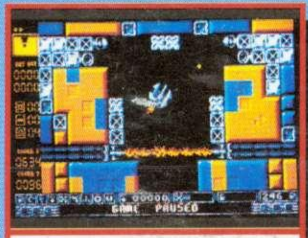






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